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Subpoena, in law a writ or process issued by a court, commanding the person named in it to attend court or appear under a penalty for failure to do so. At first this writ was only in use for the purpose of compelling the presence of a witness in court to give testimony. But now, in most of the states, officials and other bodies having judicial powers are authorized to compel the attendance of witnesses by this process.

A subpoena issued for the purpose of compelling a witness to appear in court to give evidence is called a *subpoena ad testificandum.* A *subpoena duces tecum* is issued where it is necessary to produce documents in the possession of a party, such documents to be used as evidence in a trial. These two subpoenas are similar, except that the latter specifically enumerates the letters, books, papers or other documents required in court. The fact that these documents, of whatever nature, are private, has no bearing, for they must be produced in conformance with the subpoena, and it is then the duty of the judge, or other officer, to decide if they shall be produced in evidence. Where such documents might incriminate the person who has them, they need not be brought into court.

Failure to appear when summoned by subpoena is contempt of court, and may be punished accordingly, though a witness may be excused if sufficient cause is shown.

Subway, in engineering, an underground passage, but more popularly an underground railway, such as the subways of New York and London. The first underground railway was begun in London in 1853, with the object of relieving the press of traffic on the streets. This, and the one begun in 1870, were steam roads, but in 1886 an electric subway was begun. This proved so useful that large scale subway construction was begun, with the result that in 1923 London had the greatest system of underground railways in the world.

Subway construction began in New York City in 1900. The first line was completed in 1904; this was a four tracked line 20.8 miles long. It begins at the City Hall, extending, in the form of a Y, northeast to Bronx Park and northwest to Kingsbridge. From this time forward subway construction was rapid, and New York now has the second largest system. City engineers now maintain that subways should run beneath the regular streets.

Paris has a large total subway mileage, and shorter lines are in operation in Boston, Glasgow, Budapest and Berlin.

Suckers, a family of fresh water fishes, chiefly American. The mouth is prolonged, rather for nibbling and sucking than for seizing. The flesh is rather tasteless and is full of bones. Suckers, buffalo fish, and redhorse are closely allied. To say of one that he is a "sucker" is to intimate that he takes bait easily and is caught too readily—too easily deceived.

Suckling, Sir John (1609-1642), an English poet. He is one of a group of poets including Herrick, Lovelace, and Carew, who are sometimes called the Caroline poets, because of their adherence to Charles I,—Carolus, the Latin word for Charles, giving rise to the adjective Caroline. They were also called the Cavalier poets for a similar reason, the Royalist party being known as Cavaliers. Suckling was educated at Cambridge. He became a Royalist and man of fashion at the court of Charles I. He wrote a play presented with elaborate scenery, then a new thing except in masques. He is said to have invented the game of cribbage. He raised a troop of 100 horsemen to aid the king against the Scots, and was much laughed at for the gorgeous equipment with which he supplied them. The expedition cost him about $50,000, but was a total failure. Having joined in a scheme to release Strafford from the tower, Suckling was charged with treason and was obliged to flee from England. He is believed to have committed suicide in Paris. Suckling wrote several plays, interspersed with songs much better than the plays themselves. His *Ballad Upon a Wedding* is an exquisite lyric for which his name has been and will be remembered. It represents a rustic describing a fashionable wedding. It contains the well known lines:

> Her feet beneath her petticoat
> Like little mice stole in and out
> As if they feared the light.

Sudan, or **Soudan,** sōō-dän′, a vast, somewhat indefinite region in central Africa. It lies between the Sahara and the Congo basin, and extends from Senegambia on the west to the Red Sea. It comprises 1,014,600 square miles of territory and is inhabited by some 4,000,000 people, chiefly Negroes and Arabs. The latter are the traders and dominant element. The region is reached by way of the Red Sea, the Nile, and from the Mediterranean by caravan. The commonest name of this region is Anglo-Egyptian Sudan, the name deriving from the fact that England is the dominant country.

Sudermann, zōō′dĕr-män, **Hermann** (1857-), a German dramatist and novelist. He was born at Matzicken, Prussia, a little village near the Russian frontier. His parents were very poor, and the boy could go to school only until he was fourteen, when he was apprenticed to a chemist. But he managed to get an education and in 1875 went to the University at Königsberg, and two years later to the University of Berlin. After some time spent as editor of a political journal he turned to literature, a field in which he is noted as one of the greatest living German writers. Sudermann has written four novels, *Dame Care, The Cat's Bridge, The Undying Past,* and *The Song of Songs.* Of these *Dame Care,* a melancholy, mystic story, is the greatest. It has been called "one of the very few truly great German novels." His first play, *Honor,* appeared in 1888, shortly after *Dame Care,* and has been followed by more than a score of other dramas. Among these are *Sodom Iolanthe's Wedding,* and *Magda,* his greatest drama. It has been produced in America with great success. Others are, *John the Baptist, The Three Heron Feathers, The Joy of Life,* and *Storm Brother Socrates.* Most of his dramas deal with the dark side of life and in a somewhat pessimistic fashion.

Sue, sū, **Eugene** (1804-1857), a French novelist. His father was a physician of Paris. Sue was educated for medicine and served in the army and navy as a surgeon. In 1829 he came into wealth by the death of his father, and henceforth devoted himself to writing novels. His noted works are *The Mysteries of Paris* and *The Wandering Jew.* The former deals with the wicked ways of a wicked city. The latter is a powerful description of the supposed wanderings and adventures of a Jew, unable to die, forbidden to rest, and condemned to move on for one thousand years. The tale is founded on the legend of the Jew who refused to permit Christ to rest a moment when toiling along bearing His cross to the place of crucifixion.

Suetonius, a Roman historian. The dates of his life are not known, but he was a private secretary of Hadrian about 119-121. He was a friend of the younger Pliny with whom he was known to have traveled in 112. The chief work by which Suetonius is known is the *Lives of the Caesars.* This contains anecdotal biographies of the first twelve emperors, including Julius Caesar. Students are indebted to Suetonius for many details of the private life of the emperors.

Suez Canal, sōō-ĕz′ ka-năl′, a ship canal extending across the Isthmus of Suez from Port Said on the Mediterranean to Suez on the Red Sea, ninety-seven miles distant. There is no current. The canal has been deepened since its first construction. It permits the passage of ships drawing twenty-eight feet of water and is seventy-two feet wide at the bottom. The top is from 196 to 327 feet wide, according to the nature of the soil. In places the great ditch is faced with walls of masonry. At one point the contractors were obliged to blast a passage ninety feet deep through a ridge of sandstone. Advantage was taken of the deep beds of dried up lakes. Lake Timsah in particular, near the middle of the Isthmus, has been refilled with sea water and forms a welcome body of water in which the largest ships may pass or anchor. The town of Ismailia has grown up on the western bank of the lake. A fresh water canal forty feet wide and nine feet deep, dug from the Nile to provide the original workmen with water, joins the Suez Canal at this point by locks. It has been extended to Suez on the Red Sea, and a large water-main with frequent plugs was laid in the opposite direction to Port Said. This Nile canal is still utilized. It affords passage for canal boats and, through systems of pipes, it supplies water for irrigation and household purposes in the Suez region.

The Suez Canal Company was organized by Ferdinand de Lesseps, a French engineer, in 1856. Said Pasha of Egypt gave him an exclusive permit and took one-fourth of the stock. Half of the shares were taken in France and a few in England. Work began April 25, 1859. The canal was opened November 17, 1869. The original cost was $100,000,000. Forty million dollars have been spent in improvements. Steam dredges and other labor-saving machinery were employed, but the work was done largely by 80,000 Egyptian fellahs, commanded to labor by the khedive, and by a motley crowd of wretched laborers—Nubians, negroes, Arabs, and Greeks. A large part of the loose sand was carried out in baskets by these laborers.

Port Said has been improved by the construction of extensive breakwaters, basins, quays, a lighthouse, and by the installation of waterworks and electric lights. It is a busy commercial town of 50,000 inhabitants. Suez has similar improvements, including several large dry docks for the repair of steamers.

In 1875 the British government paid the Egyptian ruler $20,000,000 for his interest. Lord Beaconsfield was criticized severely, but these shares would sell for five times that sum today and are yielding an annual dividend of over $5,000,000. The canal is now to all intents and purposes a British waterway. It affords the shortest water route by 5,000 miles between London and Bombay. Over one-half of the Suez patronage is British. Next in order come the ships of Germany, France, Holland, Austria, Russia, and Japan. The United States is represented hardly at all.

While passing through the canal, ships are under control of competent pilots. A Suez pilot is required to speak at least two languages—French and English.

There are about 120 pilots on the canal and they receive an average of $3,000 per year for their services. A pilot receives ten dollars for a night's work. His time of work is regulated by the government. Each pilot takes four or five ships through a part of the canal a week and is required to take several hours' rest after guiding a ship through his district. On the canal proper there are about eighty pilots; twenty of these live at Port Said, forty at Ismailia, and the other twenty at Suez, thus dividing the canal into three districts. Those at Suez and Port Said are engaged in taking the ships out of the port and bringing them in. Those at Ismailia engage in the navigation of the canal proper.

To avoid washing the banks, steamers are required to slow down to six miles an hour. From seventeen to twenty hours are required for a transit. There are frequent widenings to permit large ships to meet and pass. Owing partly to the difficulty of navigation, the Red Sea sailing vessels are no longer allowed in the canal. In 1920 4,009 vessels passed through the canal, while in 1921 the number of passages was 3,975. In 1917 and 1918 the number of passages was considerably less than 3,000. The receipts for 1921 were 149,251,000 francs, and 18,118,999 tons of shipping made the passage.

Under the terms of a new franchise, obtained in 1910, the charter has been extended to the year 2008. The Egyptian government is to receive $20,000,000 in four payments and in 1921 it began sharing in the profits on a rising scale, starting at four per cent; this will increase to twelve per cent by 1968. After that, and until the end of the concession, the government is to get half the profits, with the sole restriction that the company's share shall not be less than $10,000,000. Thus, if the funds available for distribution should in any year be less than $20,000,000, the company will appropriate $10,000,000 and the government will get the rest.

Sugar, a sweet substance contained in the sap of many plants. Common sugar is obtained in commercial quantities from plants known as the sugar-cane, sorghum, hard maple, date palm, and sugar beet. Chemically pure sugar is a solid crystalline, sweet, odorless body easily dissolved in water, but is almost insoluble in pure alcohol. All absolutely pure sugars taste alike. The various sugars are known to the trade as cane sugar, beet sugar, maple sugar, according to the plants from which they are obtained. All commercial sugars are alike in chemical composition. The difference in taste is due to the presence of some ingredient from the plant. The de-

lightful flavor of maple sugar, for instance, is due to the presence of a maple ingredient, a volatile ether that is not sugar. Cane sugar is more soluble than beet sugar, hence it tastes sweeter. All the commercial sugars are known to the chemist as cane sugar or common sugar.

In addition to common sugar, chemists and manufacturers of sirups reckon with a sugar that remains more naturally in a liquid state. It is called grape sugar from its occurrence in grapes and other fruits. Chemically, a molecule of cane sugar and a molecule of water are equivalent to two molecules of grape sugar, or glucose as it is called. That is, the addition of a volume of water to $C_{12}H_{22}O_{11}$, or common sugar, gives two volumes of $C_6H_{12}O_6$, or glucose, which, of course, is half as sweet as common sugar. Honey is grape sugar. All sugar must be converted into grape sugar before digestion. The chemical elements of sugars are simply carbon and water.

The uses of sugar in baking, cooking, preserving, sweetening beverages and fresh fruit, and in the preparation of confectionery are too well known to require description. The ancients had no sugar save honey. A large part of the world is not familiar with sugar, but its use is increasing rapidly. The annual consumption of sugar has risen in England to ninety pounds per person. Prior to the Civil War Americans consumed about 300,000 tons of sugar a year, in 1919, according to the reports of the department of agriculture, the world produced 16,600,000 tons of sugar; of this quantity, 4,339,000 tons were beet sugar and 12,261,000 tons were cane sugar.

U. S. SUGAR CROP, 1919.

	Gallons of Syrup	Pounds of Sugar
Maple	1,922,180	8,894,560
Sorghum	34,000,000	
Cane		629,216,000
Beet		713,741,120
Total	**35,922,180**	**2,351,851,680**

The census of 1920 reported eighty-five beet sugar factories, 202 cane sugar factories and 20 sugar refineries in the United States. In 1922 the output of cane sugar in the United States was 454,234,000 pounds and that of beet sugar 1,348,000,000 pounds, making a total of 1,802,234,000 pounds. In 1921 the consumption of sugar per capita was 97.8 pounds, as against 58.8 pounds per capita in 1900. The United States leads the world in the consumption of sugar and in addition to the quantity produced in the country over 6,000,000 pounds are imported annually.

The test for sugar is simple. A ray of polarized light is turned to the right in passing though a solution of cane sugar, and is turned to the left in passing through glucose or grape sugar. For this reason the chemist calls the one sugar dextrose or right-handed, and the other levulose or left-handed. The test is made with a piece of apparatus called a polariscope. The government expert desiring to test a shipment of sugar entered at a custom house takes a fair sample of the sugar. He dissolves a given weight of the sugar in a given weight of water and examines the solution with his polariscope. The direction taken by the refracted ray and the degree of divergence,—the size of the angle—enable him to determine the kind and the strength of the sugar offered. It is easy, then, to compute the amount of duty to be paid. Pure food experts apply the same test to determine whether preserves and other articles offered for sale are put up in sugar or in glucose. Sirups are tested in a similar manner. Grape sugar or glucose is considered an adulterant. Its sale as sugar is a fraud.

See SUGAR-CANE; MAPLE; BEET; GLUCOSE; CARBON; FOOD; STARCH.

Sugar-Cane, a tall, heavy plant of the grass family, noted for a large yield of sweet sap. It is closely akin to the sorghum, but is larger, better flavored, and is sweeter. It requires a warm climate, a moist soil, and a long growing season. Sugar-cane produces abortive seed heads. It is planted by laying canes along in a furrow. New plants spring from buds at the joints. The plant grows from five to fifteen feet high. The canes are from one to two inches in diameter.

Louisiana leads the Union in the production of cane sugar. A low, level belt of rich soil follows the Mississippi River to New Orleans and extends westward a few miles inland, clear into Texas. It is one of the

most fertile regions in the world, and is perfectly adapted to cane raising. The fields are plowed in long, narrow bands, and are provided with a system of parallel and cross ditches; for, in addition to being but a few feet above Gulf level, the cane belt has an annual rainfall of fifty inches, or over four feet of water. As stated, cane is laid in furrows about five or seven feet apart during the winter, or from September to March. The field is cultivated one way with mules and shovel plows. The cane is ready to cut in November. Complete plantations have spur tracks, or tramways laid out into the fields. Cane is stripped, topped, and sent on cars to the sugar house.

A complete sugar-house equipment with an engine costs several hundred thousands of dollars. The plant is under cover. The cane is dragged by power up an endless apron into a hopper and is fed to gigantic steel rollers that crush 1,000 tons a day. The cane is crushed and recrushed. The sap runs away in troughs to huge vats. The crushed cane or bagasse goes off on an endless carrier in another direction to feed the flames in a hissing white furnace. The sap is purified, evaporated, and refined, finally coming to barrel as white, granulated, or brown, that is to say, as firsts, seconds, thirds, open kettle sugar, and New Orleans molasses.

All products are handled through wholesale houses. A grocery in Franklin, forty yards from the largest sugar plantation and sugar house in Louisiana, cannot get a barrel of local sugar except through a New Orleans wholesaler. The last American census gave 351 factories. Planters sell their cane to larger owners. About eighteen per cent of the total weight of the mature cane is sugar, but part of the juice is left in the bagasse. As a matter of fact, a ton of cane yields 160 pounds of sugar.

Sugar-cane is a native of Southern Asia, possibly of China as well, where it has been cultivated for 3,000 years. Columbus carried it from the Canary Islands to the Carribean Sea. It was introduced in Louisiana by the Jesuit fathers in 1751. The chief foreign or outlying sugar-cane-producing regions are India, China, Cuba, Java, Mauritius, Peru, and Argentina.

See SORGHUM; HAWAII; LOUISIANA.

Suggestion. See CONSCIOUSNESS; IMITATION; PSYCHOANALYSIS.

Sulla (138-78 B. C.), a noted Roman known in history as the Dictator. He was well born and had the advantage of an education. His youth was passed in notorious and shameless debauchery. He was a brilliant soldier and officer, serving with distinction in the Jugurthine War under Marius and later in the Cimbrian and Social wars. He incurred the enmity of his old commander Marius by receiving an appointment to the command of the army designed to subdue Mithridates, a position coveted by Marius himself. Sulla was obliged to flee from the city secretly, yet, reëntering at the head of an army, he drove Marius into Africa.

In 87-84 B. C. he carried on a vigorous war in Greece and Asia. He forced Mithridates to sue for peace, and loaded himself and soldiers with rich spoils. In the meantime Marius had died, having first secured the passage of a measure proscribing Sulla and confiscating his property. Sulla, being free to attend to Rome and his enemies at home, landed at Brundisium with an army of 40,000 men. He defeated the adherents of Marius in four battles and, flushed with victory, took possession of Rome. Six thousand Marian prisoners of war were executed in the public circus. Lists of citizens to be slain were posted in public. Victims were hunted like wild animals. The city ran with blood. Many a supporter of his old friend Marius fled into the provinces only to be followed by an emissary bent on murder. In 81 B. C. Sulla counseled an obsequious Senate to make him dictator, a position he appears to have resigned voluntarily a short time before his death. He took care of his old soldiers by giving them lands in various parts of Italy. Sulla's conduct was no doubt the joint product of a natural disposition and the cruel, corrupt spirit of the times in which he lived; but his enormities were such as to cause his name to live forever.

Sullivan, Sir Arthur Seymour (1842-1900), a distinguished English composer of light operas and sacred music, collaborator with W. S. Gilbert in the works that made their partnership famous. He was born in London, the son of an Irish band-

master and music teacher. Sir Arthur displayed unusual talent at a very early age, and when only 14 won the Mendelssohn scholarship, then recently established. Under this scholarship, Sir Arthur studied at the Royal Academy of Music, and also at the Leipsic Conservatory. Returning to London in 1861, he won success the next year with his incidental music to Shakespeare's *Tempest,* played in the Crystal Palace. For some years he was organist at Covent Garden Theater, and professor of composition at the Royal Academy. In 1875 began the association that produced those musical jewels, the Gilbert and Sullivan operas. Sir Arthur's *Lost Chord, The Willow Song, Orpheus With His Lute,* and *How Sweet the Moonlight* are among his finest lyric works; and the best of his sacred compositions are *Te Deum,* and *Onward Christian Soldiers.* Among the operas written with Gilbert, the best known are *H. M. S. Pinafore, The Rose of Persia, The Mikado, Pirates of Penzance, Iolanthe, The Yoemen of the Guard* and *The Gondoliers.*

Sulphur, sŭl′fŭr, a brittle, yellow, elementary substance. It is widely distributed in nature. It is twice as heavy as water. It burns with a pale blue flame. It is present in coal and it found in small quantities in all meat, eggs, and plant tissues. Fairly pure sulphur occurs in large quantities in the vicinity of active and extinct volcanoes. American production is confined practically to Utah, Nevada, Louisiana, and Mexico. Extensive deposits are known to exist in Japan, but the world's supply comes chiefly from Sicily. Computed at from $20 to $30 a ton, the island has produced not far from $500,000,000 worth of sulphur.

Sulphur, which is popularly known as brimstone, has many uses. It is administered in medicine, both as an internal remedy and as an ointment for skin diseases. Sulphur kills many bacteria. It is used in the manufacture of many articles, especially of matches, gunpowder, and fireworks. When added to rubber, it forms the useful compound known as vulcanized or hardened rubber. Burning sulphur is used as a disinfectant and also as a bleaching agent to whiten straw, wool, and silk. California orchard owners pass their fruit and nuts through smoke of sulphur to improve the color.

Sulphuric acid, or oil of vitriol, is one of the most important acids of the laboratory. It is used largely in the arts. Over 4,000,000 tons are required annually. It is prepared from sulphur or obtained from pyrites. Germany, Great Britain, and the United States are large makers of sulphuric acid. In combination with zinc, sulphur forms white vitriol; with copper, blue vitriol, which is the basis of Paris green; with iron, green vitriol, the basis of Prussian blue and many inks; with magnesium, epsom salts; and with sodium, Glauber's salts.

The nauseating odor of rotten eggs is due to a compound of sulphur and hydrogen known as sulphureted hydrogen. Sulphur behaves peculiarly when heated. At 114° C. it melts, becoming a yellow liquid. As the heating is continued, the sulphur thickens and becomes sticky. At 250° C. it is black and so thick it will hardly run. At 300° it becomes clear and limpid. At 448° it boils and forms a yellow vapor.

Sulphur is one of the few elements that blackens silver. Escaping coal gas contains enough sulphur to tarnish silverware. For a similar reason, a soft boiled egg blackens a silver spoon. A silver coin carried in the pocket is likely to blacken by reason of sulphur present in perspiration.

See POPOCATEPETL; GUNPOWDER; DISINFECTING; MATCHES; BLEACHING.

Sulte, Benjamin (1841-), a Canadian historian and poet, was born at Three Rivers, Quebec, and received his education in the public schools, which he had to leave when his father died, and earn a livelihood. For some years he worked in various clerical capacities, finally entering the service of the Dominion as a translator. His most notable work is an eight volume *History of the French-Canadians,* which is still a standard in its field. He also wrote two volumes of verse, *New Songs* and *The Laurentians, History of Saint Francis of the Lake,* and a *History of Quebec.*

Sumac, or **Sumach,** su′măk, a genus of well known shrubs and trees. The juice is usually resinous or milky. A score of species are distributed widely in the north tem-

perate zone. The most noticeable American species is the staghorn sumac. The tips of the young branches are covered densely with velvety hairs, like the young antlers of the deer, whence the name. The wood is yellow. It is too small for the cabinet-maker. It was formerly used to make the spiles or spouts employed in tapping maple trees. Greenish-white, inconspicuous flowers are followed by small globular fruit in thick, pyramidal clusters. The fruit is covered densely with sour crimson hairs. The pyramids of fruit remain on the bush all winter. They form a favorite food of the chickadee and the partridge. For want of lemons the American colonists used to steep the berries for a cooling drink. The berries also yield a red dye, much used by the housekeeper before aniline dyes were on the market. The sweet-scented sumac is a low shrub with fragrant leaves and large, green, honey-scented flowers. It is much frequented by bees in early spring. The leaves of the smooth sumac of the uplands were mixed with smoking tobacco by the American Indians. The fruit is also serviceable in making cooling drinks and for medicine. The black or mountain sumac is a dwarf species. The dried leaves of this and the smooth sumac are used by the tanner. The Indians of the West split the twigs of an aromatic western species into strips and scrape them into splints with which they fashion baskets. The material is said to be quite as serviceable as willow twigs. There are two species of poisonous sumac in the eastern part of North America. One is the poison sumac, dogwood, or poison elder of the swamps. It is a shrub from six to eighteen feet high. The other is the well known poison ivy or poison oak. If either strike an exposed part of the person when the dew is on, painful blotches appear. The poisonous principle, it is said, resides not so much in the plant itself as in a minute fungus which lives on the plant as a host.

The leaves of various sumacs are used in tanning fine leather. The Arab uses a decoction in tanning Morocco. Japanese lacquer is obtained from the sap of a sumac. Dried and ground sumac leaves are used in tanning leather. American tanners import a quarter of a million pounds, chiefly from Italy. As compared with American sumac, the European article contains more tannin and stains leather less.

See TANNING; LAC.

Sumatra, sōō-mä′trä, an island of the Dutch East Indies. It is crossed by the equator. It is 1,000 miles in length and 260 miles in extreme width. Area, 161,000 square miles. In size it ranks next to its neighbor Borneo. The population, consisting of Malays, Hindus, Chinese, a few Arabs, and certain native tribes, is estimated at 4,000,000. The prevailing religion is Mohammedanism. Many tribes have neither priests nor temples. An ancient people known as the Battaks possesses a peculiar civilization. The priests have a style of writing and a literature of great antiquity all their own. They began at the left hand lower corner and place the letters, one above the other, in a vertical column until the top of the page is reached; then a second column is built up from the bottom. Since 1666 the island has belonged practically to the Dutch. Sumatra resembles Java. The interior is mountainous. Lofty volcanoes rise to a height of 12,000 feet. Interior forests and jungles shelter the elephant, the two-horned rhinoceros, the orang-utan, the tiger, deer, antelope, serpents, and birds of tropical plumage, as well as tribes of men still little known. The coast region yields the Dutch large supplies of timber, gutta-percha, pepper, sago, rice, tobacco, coffee, and sugar. The coast is divided into six residencies, each under a Dutch ruler. An American traveler would reach Sumatra by way of New York, London, and Singapore, or else by way of San Francisco and Manila.

The largest and most important cities are Bencoolen and Padang, on the west coast and Palembang in the southeastern part. Dutch engineers have built highways connecting the east and west coast.

Summerland, British Columbia, is on the Canadian Pacific Railroad and on Okanagan Lake, 10 miles north of Penticton, with which it has steamer connection. Summerland is in a prolific fruit belt, the chief product of which is peaches; and the industrial plants of the city include fruit canneries, box and crate factories, machine shops and lumber mills.

The city owns its irrigation, domestic water, and electric light systems. Okanagan College is located here, and at the edge of the city is a Dominion Experimental Farm. Population, 1921, 2,500.

Summerside, Prince Edward **Island,** the county town of Prince County, is on Northumberland Strait and on the Prince Edward Island Railroad. The city has a large export trade in lobsters and oysters, and is an important center of the fox farming industry. There are manufactories of harness, sash and doors, shoes, tobacco, flour, rolled oats, canned lobsters and threshing machines.

Summerside has a high school and public primary schools, seven churches, a hospital and a library. The electric light and power and water systems are municipally owned and controlled. The population was 3,228 in 1921.

Sumner, Charles (1811-1874), an American statesman. He was born in Boston and educated at Harvard. He began the practice of law in 1834. A little later he spent two years traveling in Europe. In 1845, in anticipation of the admission of Texas, to which, as well as the Mexican War, he was opposed, he brought himself into prominence by an oration against war. It appeared in print afterward as *The True Grandeur of Nations.*

Shortly afterward he became a recognized Free Soil leader. His position he defined as a determination never to "support any candidate for the presidency who is not known to be against the extension of slavery, even though he have received the sacramental unction of a regular nomination." In 1850 the Free-Soilers of Massachusetts combined with the Democrats against the Whigs. They elected George Boutwell governor and sent Sumner to the United States Senate. He was a cold, logical, not a lovable man, but a man of social position, sincerity, courage, and unswerving integrity. He was for nearly a quarter of a century the leading anti-slavery senator. He urged the repeal of the Fugitive Slave Law as inhuman, and opposed the Know Nothing party as un-American. The compromise measures of Clay and Douglas were his particular aversion.

His attitude and frequent use of personality gave deep offense in the South. May 22, 1856, at the end of a bitter debate, Preston C. Brooks, a fiery representative from South Carolina, entered the Senate chamber after the hour of adjournment and attacked Sumner with a heavy cane as he sat writing at his desk, beating him until he fell unconscious. The brutality of the attack left its effects on Sumner to the end of his life, but it made him the hero of Boston and gave him a seat in the Senate for life. During the Civil War, he supported President Lincoln. He was foremost in the effort to sustain the impeachment of President Johnson. He was influential in requiring the seceding states to grant the negro the right to vote as a condition of restoration to the Union. He supported Grant's administration at the first, but objected to the proposed settlement of the Alabama Claims on the ground that England should be punished heavily for aiding and abetting the cause of slavery. He opposed and defeated a treaty for the annexation of Santo Domingo, and so far got out of sympathy with the Republican party that he supported Horace Greeley in the presidential campaign of 1872. There is no question as to his integrity and commanding ability, but he was too narrow—too much out of sympathy with the world—to rank with Lincoln in popular esteem.

Sumptuary Laws, the common designation of laws whose chief ends are—or more properly, were—the reduction of poverty and crime by the practice of abstemiousness and the stimulation of home industry (plus the increase of revenue) by discouraging the use of exotic food, clothing and other articles of everyday use. Almost all ancient legislation recognized the necessity of such laws. Thus the ancient Greeks were forbidden to hold elaborate and costly funeral services, to give costly banquets, or to wear silver or gold ornaments or embroidered apparel. Similar restrictions were, at a later time, placed upon the Romans.

In England, rigorous sumptuary laws were in effect from the reign of Edward III to the Reformation. In Edward's reign, ordinary meals were to consist of not more than two courses, and of not more than two

kinds of food at each course. Further, the kind of clothing that each class of people might wear was regulated. France and Germany at different times had similar laws.

In modern times sumptuary laws exist only in relation to the traffic in intoxicants, taking the form of licensing and prohibition laws.

Sumter, Thomas (1734-1832), a partisan leader in the War of the American Revolution. He was born in Virginia. He died near Camden, South Carolina. He was present at Braddock's defeat in 1755. After the surrender of Charleston to the British in 1780, Sumter placed himself at the head of a body of light horse similar to that led by Marion. His pluck, endurance, and activity gained him the name of the "Carolina Game Cock." He swept down upon the foraging parties of Cornwallis with such cheerfulness and cut off portions of cavalry with such success that the British commander declared him one of his "greatest plagues." Tarleton caught him napping on the Catawba once. At the close of the war Congress gave Sumter a vote of thanks for gallant action at Eutaw Springs. Later South Carolina sent him to Congress, first as a representative and afterward as a senator. In 1809 President Madison appointed him United States minister to Brazil. Sumter was the last surviving officer of the Revolutionary army. See MARION.

Sumter, Fort, a national fortification situated on a shoal in Charleston harbor. It is about three miles from the city. The original fort was a brick structure with walls about forty feet in breadth, resting on a riprap foundation. The opening of the Civil War dates from the firing on Fort Sumter, April 12, 1861. The attack was conducted by General Beauregard. Major Robert Anderson, with a garrison of seventy-five men, surrendered the fort on the 13th. They were permitted to board a steamer for New York City. Authorities state that no less than 2,500 shot and shell struck the walls of the fort or fell within them. No one was hit on either side during the bombardment. Various attempts were made by the Union forces to retake Fort Sumter. General Gilmore conducted a siege lasting from August 12 to December 11, 1863. Nearly 20,000 shot struck the walls or fell within the inclosure. The walls were almost demolished, without success, however. The fort was evacuated by the Confederate army on the approach of Sherman, February 17, 1865. On April 14th the Union forces, then occupying the city, held impressive flag-raising services. The same American flag was run up that Anderson had lowered four years previously. The site is now occupied by a modern ironclad fort with steel turrets, and is defended by huge rifles and mortars of modern patterns. See CHARLESTON; CIVIL WAR.

Sun, the center of our solar system. It is one of the fixed stars. It is the source of the earth's light and heat. We are at an average distance of 92,900,000 miles from the sun. Astronomers think that future measurements cannot change this estimate materially. The distance is so great that figures give a very small idea. A railroad train, running at an ordinary speed of thirty miles an hour, would require 350 years to reach the sun. Some one has said that, were it possible for a child to touch the sun with the tip of its finger, it would die of old age before the sensation of pain could run along the nerves of the arm to the child's brain.

The diameter of the sun is about 109 times that of the earth, or 866,500 miles. If the sun's center were at the center of the earth, the orbit of the moon would be little more than half way from the center of the sun to its circumference; that is to say, the moon's entire path would be within the sun, nearly half way to its center. The average weight of the sun is about 1.4 times as great as that of water. Were the entire weight of the sun suspended, a steel rod 3,000 miles in diameter would be required to support it. A child weighing seventy-five pounds on the surface of the earth would weigh a ton on the surface of the sun. Like the earth, the sun turns on its axis. Each revolution requires 25.35 of our days.

A very interesting subject of study is the occurrence of dark spots on the surface of the sun. Very possibly they are craters in

the sun's atmosphere, caused by tremendous gaseous explosions. Investigation of sun spot activity shows that by decreasing ultra-violet and increasing red rays the spots favor the growth of vegetation, especially of trees. Examination shows the presence of some 35 chemical elements in the sun. Most metals, including iron, nickel, copper, zinc, silver, tin, and lead have been us, and nitrogen are thus far supposed to be wanting.

Figures fail to convey an adequate idea of the amount of light and heat emitted by the sun. Some idea of the heat may be had by a statement that the tropical sun will melt an inch of ice an hour, and that the heat received during the year is enough to melt a layer of ice 177 feet thick all over the earth's surface. Professor Young of Princeton indorses the statement that, were the sun itself frozen solid to a depth of 64 feet, the heat emitted would melt such a crust in one minute.

See ARCTURAS; STAR; SPECTROSCOPE; SEASONS; LIGHT.

Sunbird, a tropical bird, which resembles the humming birds of America in smallness and brightness of plumage. Like these, they feed on the nectar of flowers, and on the minute insects which the flowers attract. The species are numerous, and are found in Asia and Africa.

Sunbury, Pa., the county seat of Northumberland County, is on the Susquehanna River and on the Philadelphia & Reading and Pennsylvania railroads, 54 miles north of Harrisburg. There are a number of industrial establishments, producing flour, lumber products, silk and woolens, and foundry and machine shop products. The Pennsylvania Railroad has machine and repair shops here.

Sunbury has good public schools, attractive city and county buildings and a large hospital. In 1920 the inhabitants numbered 15,721.

Sunday, the first day of the week. See SABBATH.

Sunday, William Ashley (1863-), an American evangelist, best known as "Billy" Sunday, was born at Ames, Iowa. After completing high school studies, he attended Northwestern University for a time, but did not finish his course. From 1883 to 1890, Mr. Sunday was a professional baseball player. At various times he was with the Chicago, Philadelphia and Pittsburgh National League teams. During this time he was very popular, being one of the best players in the United States. After becoming a religious convert, Mr. Sunday served as secretary of the Y. M. C. A. in Chicago, 1891-1895. In 1903 he was ordained a Presbyterian minister, but had begun evangelistic work in 1896. After a few years of evangelistic work and revival meetings, he had a great host of followers. His methods have been severely censured. Some call him a sensationalist; some say he is vulgar; others say he is insincere. But it is now considered unfair to regard him so. And it must be said in his favor that, though his speech is crude and slangy, and his platform manner unconventional, he is a vital, genuine person, who appeals directly and powerfully to his auditors.

Sunday School, a gathering for religious instruction held usually in a church before or after regular Sunday exercises. Such gatherings are nothing new. Organzations of this sort have existed for centuries within all churches embracing a large membership. The Catholic church in particular has a well organized system of catechetical instruction, but the term as used generally is applied to the modern Protestant Sunday school. In this sense we may say the first Sunday school was organized by Robert Raikes at Gloucester, England. He was led to this step by observing the great number of workmen's children who seemed to be worse than wasting their Sundays. He began by employing women who kept school on week days to receive children on Sundays.

Raikes began his experiment in 1781. The movement so commended itself to the churches all over Great Britain that in five years' time it is estimated there were a quarter of a million children receiving regular instruction in Sunday schools. The movement spread to London where the first Sunday school was formed in 1803. Sabbath schools were opened throughout Scotland and in the Protestant portions of Ireland. New England was slow to take up the movement, considering it not only an improper use of the Sabbath but an infringement on

the home. The first American Sabbath school was opened in Philadelphia in 1790. A society for the promotion of the work was formed in New York in 1816. The first national Sunday school convention was held in New York in 1832. A world convention was held in London in the year 1889.

In 1872, the International Lesson Series was agreed upon and for nearly a quarter of a century these lessons were in use by the Protestant Churches throughout the world. Then they were gradually replaced by a graded system of lessons for all classes except those in the adult department. Many churches now have one or more classes for training teachers for the Sunday School. Each Protestant denomination has a record for directing the educational work among its churches.

In 1918 there were in the United States 145,975 Sunday schools with an enrollment of 17,715,224 teachers and pupils. The World's Sunday School Convention met in Japan in 1920. There are about 325,000 Sunday schools in the world.

Sunderland, a seaport in the county of Durham, England, situated at the mouth of the Wear and about 14 miles from Durham. It is one of the largest coal-shipping ports in the world and is also largely engaged in ship-building. The chief manufactures are machinery, glass, earthenware, chemicals, ropes and chains; there are also marine engine works, glass and pottery works, cable factories, and establishments where iron products are turned out in great quantities. Fishing gives employment to many of the inhabitants.

There are rich coal mines in the vicinity of Sunderland, some of them very deep. There are extensive wet and dry docks on both sides of the river, these being built on land that has been reclaimed from the sea. There is a good harbor here, which is defended by batteries in the form of two piers of great length. The streets are broad and well lighted and there are some fine buildings, one of the ancient structures being Saint Peter's Church, having portions of an old monastery dating from the seventeenth century. There are also a fine assembly hall, a large infirmary, club houses and spacious halls for workingmen. The largest park comprises 70 acres. The borough has been extended several times and now includes the townships of Bishopwearmouth, Monkwearmouth, and Monkwearmouth Shore, this latter dating from the seventeenth century. The population is 159,100.

Sunderland, Jabez Thomas (1842-), an American Unitarian minister, was born at Howarth, Yorkshire, England. He received his education at several American universities, and was pastor of churches in the United States, Canada and England. He visited India at the instance of the British Unitarian Association, and subsequently lectured on conditions in that country. As Billings lecturer of the American Unitarian Association, he visited the Far East in 1913. He was editor of the Unitarian Monthly from 1886 to 1895. Among his published books are: *A Rational Faith, What is the Bible, The Liberal Christian Ministry, The Bible: Its Origin, Growth, and Character, and Place Among the Sacred Books of the World and Liberal Religion in India.*

Sundew, a group of insectivorous plants with perennial roots or root-stocks. The sundews are plants of similar aspect to that of the plant known as the Venus' fly-trap, except that the leaf does not close up on the insect. The round-leafed sundew is found in bogs from Labrador to Florida and California. See VENUS' FLY-TRAP; PITCHER PLANT.

Sundial, a device indicating the time of day by means of a shadow falling on a dial. The dial is usually a circular surface marked off with the hours like the face of a clock. The time or hour of the day is indicated by a shadow cast by means of a triangular finger; hence the expression, "the finger of time." This finger stands at the center; its index edge must be parallel to the earth's axis, that is to say, the finger must point toward the North Star. Sun dials are of use, of course, only when the sun shines and in the daytime. In its essentials this method of telling time differs in no important respect from a shadow cast by a church steeple, a tree, or a fence post by which the farmer and others engaged in outdoor employment are wont to note the dinner hour. The fact that the shadow cannot fail to advance with the progress of

the sun has led to the proverbial expression, "as true as the dial to the sun." The Egyptian peasant constructs a sundial by thrusting a palm stem into the earth. This he surrounds with a rude circle of stones. George Washington's sundial at Mt. Vernon bears the truthful inscription, *Horas non numero, nisi serenas,* I record none but sunny hours. See NEWTON; CLOCK; NORTH STAR.

Sunfish, a genus of active, hardy fishes, shaped not unlike a pumpkin seed. Unlike the flounder, the sunfish is flattened laterally and swims on edge. A dozen species interlap in the territory extending from the Great Lakes to Mexico. The most common species, also called bream, pumpkin-seed, pondfish, and sunny, has a greenish olive back, bluish sides mottled with orange, and an orange-colored belly and lower fins. Five to ten inches long.

Sunflower, a tall herb of the composite family. Wild sunflowers are coarse, rough plants with no beauty of foliage, but when they are in the full bloom of autumn they form a feature of our landscape worth going a day's journey to see. Altogether there are about eighty species, nearly all native to North America. Cultivated sunflowers are a field crop of importance in Europe, especially in Russia, where the seeds are eaten raw on the street as peanuts are in this country. A table oil is pressed from the seeds. A second pressing yields an oil for candle and soap making. The seeds from which oil has been pressed are sold to Denmark as oil-cake for chicken feed. The stems are used for fuel. The cultivation of sunflowers is much the same as that of corn. Heads cured indoors on racks yield the finest oil. Ordinarily the stalks are cut and stood together in ricks heads upward until thoroughly dry. The heads are then cut off and threshed with flails. A bushel of kernels yields three gallons of oil.

Sunshine, in meteorology, light falling from the sun upon the earth's surface, without hindrance of haze, mist, fog, cloud, or dust storm. As a matter of fact the sun is shining always. Some germs grow in darkness, but, speaking in a general way, light is one of the essentials of plant and animal growth. For the farmer, gardener, and stock raiser, no artificial light equals natural sunlight. Some crops are favored by a share of cloudy weather, but, like air, warmth, and water, clear sunshine is one of the great promoters of life—one of the essentials of prosperity.

As half of the hours the world over belong to the night, a cloudless region may have not to exceed 365 times 12, or 4,380 hours of sunshine yearly. Sunshine is in one respect the opposite of rainfall. As a rule, the less rainfall, the less cloudy weather. Perpetual sunshine, without rain, is characteristic of an arid or desert region. North America, which is the greatest food-producing region in the world, is particularly fortunate in the matter of sunshine. An area in Arizona, Colorado, New Mexico, and Mexico has an average of 3,250 hours of sunshine yearly. Surrounding this sunshine center is a zone having 3,000 hours of clear sunlight. A third encircling zone reaches the Pacific Coast, embracing in its sweep the fruit-producing valleys of California, the uplands of Kansas, the tobacco fields of Kentucky, and the cotton fields of Texas. Northern California, southern Louisiana, West Virginia, and the famous corn belt of Ohio, Indiana, Illinois, and Iowa enjoy 2,500 hours of annual sunshine. A belt crossing the continent from Massachusetts, *via* Minnesota, to southern Oregon, has 2,250 hours. Nova Scotia, Manitoba, Washington, and "sunny" Alberta, have 1,750 hours or about fifty-five per cent as much sunshine as Arizona. May and June are the sunniest months in the southern part of the United States. July is the sunniest month farther north.

Sunstroke, acute prostration from excessive heat. It may be the effect of heat from furnaces or from the atmosphere, as well as from the direct rays of the sun. There are two distinct types of prostration from heat, the symptoms of which are quite different, and the results in one case are much more to be feared than in the other. Sunstroke, known also as insolation, heatstroke and heat-apoplexy, is the more serious of the two. Heat exhaustion or heat prostration the less so.

In sunstroke the patient may be taken with great suddenness, falling unconscious, and dying almost immediately. More com-

monly a severe headache with dizziness and nausea gives warning of the approach of the attack. If this is not heeded the symptoms increase and unconsciousness soon sets in. The patient is flushed, the skin is hot and dry, and the temperature very high. A physician is required to attend such a case, but the usual treatment is cold applications, especially to wrists and neck, where on account of the large arteries the blood may be cooled rapidly. Under proper care about seventy-five per cent of cases of sunstroke recover, but those afflicted are often permanently susceptible to high temperature. Sunstroke is more common in persons who are addicted to the use of alcohol.

Heat prostration is far less dangerous, about ninety-one per cent of cases on record showing good recovery. The symptoms are extreme exhaustion, restlessness, fainting spells, and sometimes complete collapse. The surface of the body is cool, the temperature below normal. The treatment calls for hot applications and stimulants, but a physician's advice is advisable.

Superior, Wis., the county seat of Douglas County and a port of entry, is at the extreme western end of Lake Superior, at the mouth of the Nemadji and St. Louis rivers. It is about 150 miles north by east of St. Paul, Minn. Railroad service is maintained by the Northern Pacific, Chicago, Milwaukee & St. Paul, Great Northern, Minneapolis, St. Paul & Sault Sainte Marie and Duluth, South Shore & Atlantic railroads. It is connected by bridge and ferry with Duluth, Minn.

Superior has a deep, commodious harbor, and is more important commercially than industrially, shipping large quantities of grain, lumber, cement, flour, meat, iron and steel. The principal manufactories are ship yards, furniture factories, iron works, boiler shops, flour mills, machine shops and foundries.

Educational institutions, besides the public schools, are a state normal school and a Carnegie library. The municipal, county and Federal buildings are attractive, and there is a large park.

It is commonly held that in 1661 Radisson and Grosseilliers had their headquarters on the site of the city. Du Lhut established a trading post here in 1680, and in the next century a permanent settlement was made. Superior was not laid out, however, until 1885. In 1920 the population was 39,671.

Superior, Lake, the most northwesterly of the Great Lakes of North America. It is the largest body of fresh water on the globe. The general shape is oval, with the ends curved to the southwest. Measured on a curve, its greatest length is 420 miles; greatest breadth, 167 miles; area, 31,200 square miles. It is as large as Ireland. The surface is 602 feet above sea level. A large part of the bottom lies in a fold of the earth 300 feet below sea level. The northern shore is bold throughout. The southern shore varies from extensive flats to steep cliffs 300 feet high. Numerous islands are found along the shores, both north and south. The largest is Isle Royal. It is noted for its harborage, for good fishing, and as a summer resort. Fine lake trout weighing five to twenty pounds may be taken with hook and line from the cliffs. The border line between Canada and the United States passes just north of the island. The largest stream received by Lake Superior is the St. Louis River. Saint Mary's River is the outlet. Immense deposits of iron ore in Minnesota and Wisconsin and copper in Michigan are tributary. A large fleet is employed in carrying ores, grain, and lumber eastward, and coal, salt, and other heavy commodities westward. The ore boats are huge steel hulls that set low in the water, and can be quickly loaded and unloaded. The chief ports are Duluth in Minnesota, Superior and Ashland in Wisconsin, Marquette and Houghton in Michigan, and Fort William and Port Arthur in Ontario. The waters of the lake are clear and cold, and the fisheries are important. The rocks around the lake are very ancient, belonging chiefly to the Laurentian and Huronian systems of the Azoic series, and there is everywhere much evidence of glacial action. Among the Huronian rocks are greenstones, limestones, slates, etc. See PICTURED ROCKS; DULUTH; GREAT LAKES; ST. LAWRENCE.

Supreme Court. See COURTS OF LAW; UNITED STATES; CHIEF JUSTICE.

Surgery, sûr′jĕr-y, the performing of operations on a patient. A proper definition excludes baths, massage, etc., and confines surgery to cutting operations, the dressing of wounds, and the setting of broken or disjointed bones. Even among primitive people a certain amount of skill in stopping the flow of blood, in binding up wounds, in the application of healing herbs, in setting broken limbs with splints, and in the extraction of arrow points is to be expected. The early practice of surgery was bound up, no doubt, with magic and superstition. In a more advanced civilization, as that of Egypt, surgery was practiced by the priests. We find the early barbers of Europe combining surgery, physic, shaving, and hair cutting. As late as the day of Frederick the Great it was the duty of the army surgeon to shave the Prussian officers. It is only recently that surgery and medicine have been recognized widely as separate though allied branches of the healing art. The majority of doctors are yet physicians and surgeons.

The oldest literature on surgery is found in Sanskrit. It is said that Alexander the Great found an astonishing degree of surgical skill among the Hindus. A New York association of surgical specialists has taken the name of Charoka Club in honor of one of these Sanskrit writers. These Hindu writers describe or allude to a round hundred steel surgical instruments, including scalpels, lancets, saws, bone-nippers, scissors, trocars, hooks, probes, scoops, forceps and syringes. They speak of fourteen ways of wrapping a bandage and of split bamboo or rattan splints. Hindu surgeons at the time of Christ, and possibly a thousand years earlier, amputated, set broken bones, sewed cuts, used a magnet to extract particles of iron, cut out tumors, tapped for dropsy with a trocar, removed cataract from the eye, and performed many other operations requiring knowledge and skill.

Figures on the walls and monuments of ancient Egypt represent patients wearing bandages or undergoing surgical operations. In various museums of Egyptian antiquities there are considerable collections of horn cupping vessels, bronze and steel surgical instruments, artificial teeth, etc., showing that surgery had made progress. It is believed that the practice of preparing mummies led to a knowledge of anatomy. The Greeks have left a considerable list of surgical works. They were impeded by a popular prejudice against the desecration of dead bodies by surgical study. The Greeks carried their knowledge of surgery as well as of literature and oratory to Rome. The Arabians, famous in other branches of science and in mathematics, made few contributions to surgery. During the Middle Ages little of value was learned and much was forgotten. The revival of surgery kept pace with the revival of art, literature, and other forms of learning in which Italy played an important part.

The remarkable advances of modern surgery are due to several causes. The chief of these are superior schools of instruction in which the bodies of the dead are studied in detail, and the bodies of the living are operated upon by specialists in the presence of students; the general establishment of hospitals in which facilities are at hand for operating and for the proper care of patients; the use of cocaine to deaden pain, and the use of ether, chloroform, and laughing gas to produce unconsciousness during the time of operation; and, lastly, the discovery that the formation of pus may be prevented by excluding bacteria, that is to say, the germs of putrefaction, from the wound. By the use of one of the anaesthetics named above, the surgeon is able to perform operations without the knowledge of the patient, so painful in their nature that otherwise human endurance would be overtaxed and the patient would die under the knife.

The study of the germs of decay has led to the utmost care in performing operations. The instruments, sponges, towels, and all other appliances are sterilized or rendered free from living germs by heat or a bath in some such substance as carbolic acid. The operator and his assistant bathe their hands in carbolized water to kill germs. In some cases the operation is even performed in a spray of germ-killing vapor. The thread used in closing an incision and the bandages are sterilized. Many operations, once certain to be followed by decay and death, are now deemed under skillful treatment as not more dangerous than a

cut finger. The surgeon once taught that pus was a part of healing. The complete change of view may be expressed in the surgical phrase, "There is no laudable pus."

The practice of the army surgeon has undergone a revolution. His first care is to remove so far as possible all foreign, germ-carrying material from a wound. This done, he washes the wound with sterilized water, and puts on sterilized bandages to exclude germ-carrying air. Instead of dressing the wound daily, he seals it up to shut out germs and leaves nature to effect a cure. During the Cuban War intelligent army surgeons pursued this plan and sent their patients to bed to get well. The exclusion-of-germs or the let-alone theory is not always appreciated. "One poor woman who met her captain on a transport in New York Harbor cried out to the avenging heavens because the bandages of his wounds had not been changed since they had been put on in Cuba, weeks before; but her captain got well, in spite of the fact that a Mauser bullet had explored his abdominal cavity in a series of startling zigzags." The Japanese surgeons had great success in the Russo-Japanese War by this method. They removed bits of cloth when carried into the wound, but refrained from probing. They washed with sterilized water, bound up the wound with sterilized cotton, and sent the sufferer to the hospital to get well. One Japanese surgeon, who subsequently related his experiences in a medical congress in Detroit, lost but thirty-two patients out of six hundred and eighty treated in this way.

Surrey, Earl of. See HOWARD, HENRY.

Susa, sōō'sä, the Biblical Shushan, a celebrated city of the ancient world. It was the capital of the kingdom of Elam and later one of the capitals of Persia. It was a favorite city of Darius. Alexander the Great marched thither from Babylon and siezed an incredible quantity of treasure—$57,000,000 worth, it is said, of gold and silver. The vision of Daniel came to him "at Shushan in the palace." The scene of the book of Esther is laid here, as well as that of the Apocryphal Susannah. The site of ancient Susa has been identified in modern times. The city was situated in a well watered, fruitful valley, about one hundred miles or more from the head of the Persian Gulf. In its prime Susa enjoyed a vast caravan trade.

Excavations by Loftus and others have resulted in the identification of the great palace mentioned in the book of Esther, and other imposing buildings. Cuneiform inscriptions of priceless value to the historian have been unearthed.

See NINEVEH; BABYLON.

Suspension Bridge. See BRIDGE; BROOKLYN.

Susquehanna River, a river of Pennsylvania that drains the greater part of the state. It is formed by the union of two branches, one of which rises in Ostego Lake, the other in Schuyler Lake, both in New York. Entering Pennsylvania about three-fourths of the way eastward along the northern border, it flows in a zigzag across the state, and after flowing 500 miles, enters Maryland, emptying into Chesapeake Bay at Havre de Grace. The Susquehanna is shallow, swift and unnavigable, but some power is developed from the rapids. The principal affluents are the West Branch, Chemung and Juanita rivers. Along the banks of the Susquehanna are such important industrial cities as Harrisburg and Wilkes-Barre, Pa., Port Deposit, Md., and Binghamton, N. Y.

Sussex, New Brunswick, an industrial city of Kings County, is on the Canadian National Railroad, about 46 miles southwest of Moncton. It has a number of industrial establishments producing butter, cheese, wood working machinery, paper boxes, refrigerators, furniture, foundry products, concrete products and agricultural machinery. Farm produce and lime, coal, lumber, salt and plaster are procured from the surrounding country.

The city has an agricultural college, a county school, city schools, a provincial dairy school, an armory, county exhibition buildings, six churches and a park. In 1921 the population was 3,000.

Suttee, a term applied in India to a practice formerly prevalent of burning widows on the funeral piles of their husbands. The term is Hindu, meaning a faithful wife. It was the practice among the Hindus to burn dead bodies on a funeral pile constructed of wood and other inflam-

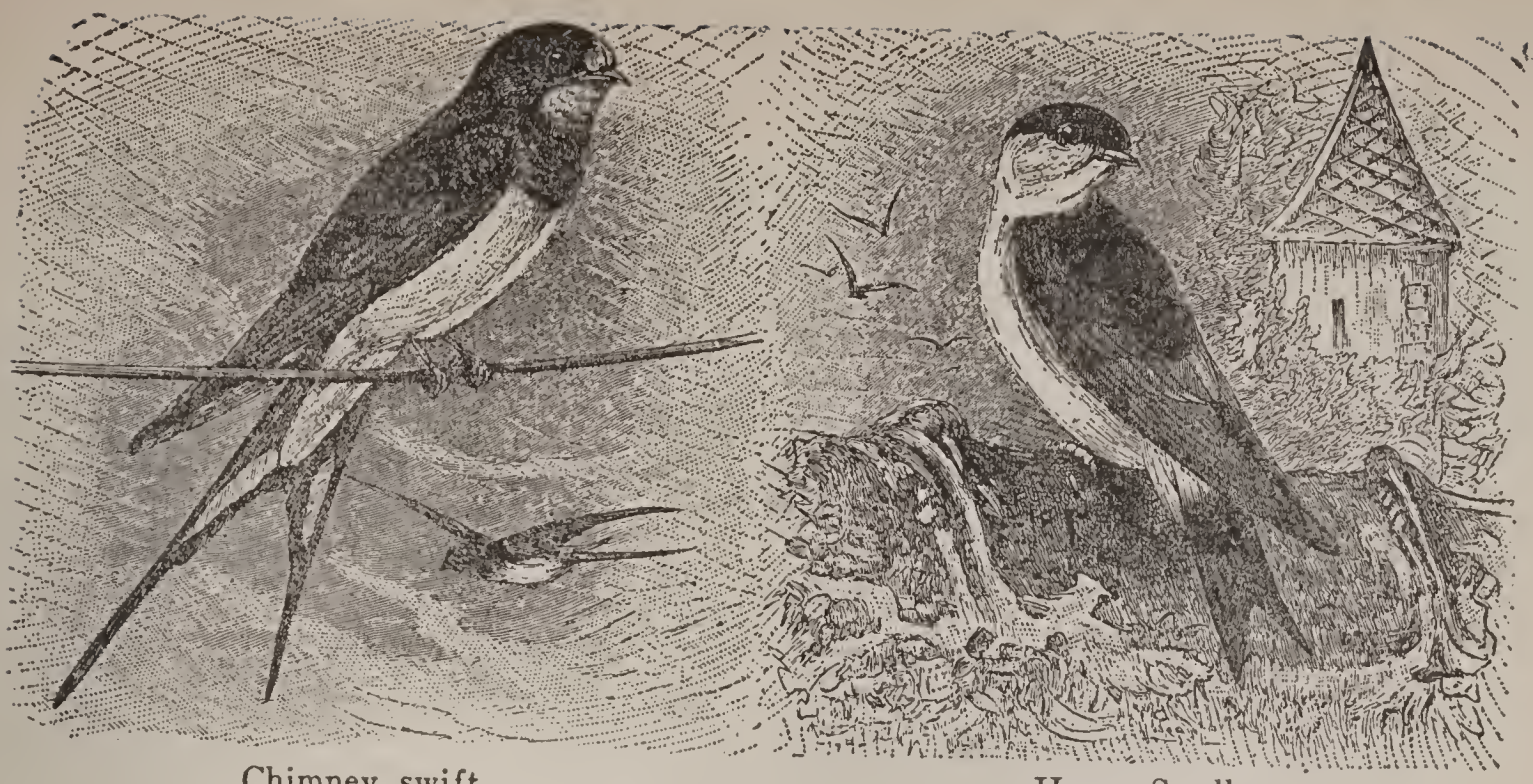
mable material. When all was ready, the devoted wife threw herself upon the pile and wound her arms about the body of her husband. The torch was then applied and she suffered herself to be burned alive. In case the husband died too far away to be brought home, she caused herself to be burned with his clothing. The suttee was forbidden by Lord Bentinck, the governor-general of India, in 1829. The practice is now almost, if not entirely, extinct. See GANGES; JUGGERNAUT; INDIA.

Barn swallow.

Swallow, a large family of swift, insect-catching, birds. In tests made recently by a French scientist, it has been definitely settled that the swallow is the swiftest of birds. One of them has been seen to make 210 feet a second, and at times even 290 feet was attained. At this rate the bird flies a mile in 18 seconds. Swallows have long, powerful wings, short, wide mouths, and small, weak feet with which they perch or cling but use scarce at all for walking. There are over eighty species. The tails of most species are deeply forked, hence the term "swallow-tailed" applied to an evening coat. Originally, of course, all swallows found nesting places in cliffs, caverns, old trees, and banks, living chiefly on insects and wintering in the tropics. The brownish gray bank swallow still nests in perpendicular cliffs of sand or clay, usually bordering a stream. Large colonies frequently occupy the same bank. The nest is made of grass and feathers about a yard from the entrance and shelters from four to six white eggs. The rough-winged swallow is a bird of somewhat similar appearance and habits.

Three species, the tree swallow, the barn swallow, and the cliff or eave swallow, have steel-blue upper parts. The tree swallow is white beneath and nests like a martin in a tree or bird box. Its tail is slightly forked. The barn swallow has a deeply forked tail and chestnut under parts. It builds nests of mud and grasses, chiefly on beams inside of a barn or other building. This is the swallow that skims over the meadows turning this way and that way, up and down, with such marvelous grace and swiftness in its search for insects.

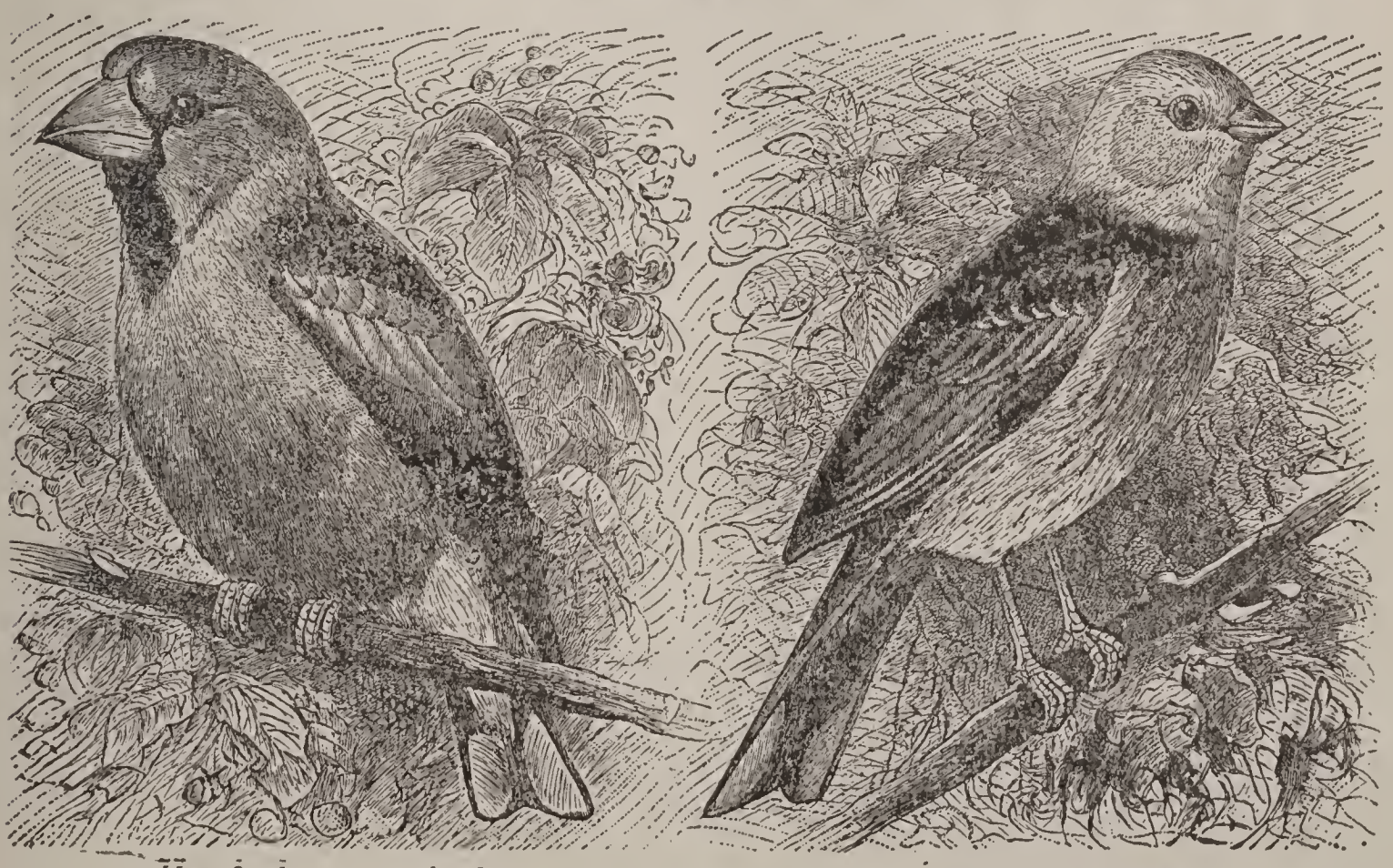
The eave swallow, with tail feathers of nearly equal length and reddish brown tail coverts, hovers in flocks on the muddy shores of a pond or puddle, making mud pellets with which to build a honeycomb of nests under the eaves of a nearby barn. Even though their nests be swept off repeatedly by the farmer's long pole, the eave swallows are not easily driven away. It would seem that they ought to be able to pay rent by catching insects. The cliff or cave swallow is a western species. It is one of the few birds that is working its way eastward. "The cliff swallow alone of all animated nature emigrates eastward," says Lowell. The three blue-backed species named frequently associate. A flock sitting on a telegraph wire may contain all three species, but they are distinguished readily by the shape of the tail and the color of the under parts. A fine cut on page 318 of *Chapman's Manual* makes the distinction plain. The return of the swallow is awaited eagerly in northern latitudes, but there is an old saying that "one swallow does not make a summer." See SWIFT; NEST.



Chimney swift.

House Swallow.

Cowbird.



Hawfinch or grossbeak.

Yellow bunting.

SWALLOWS AND SPARROWS OF EUROPE.

Swan, a family of aquatic birds closely related to the duck and the goose. Two species, the whistling and the trumpeter swan, breed in British America, migrating for the winter to the Gulf. Twenty-five years ago the trumpeter was a summer resident in the upper Mississippi Valley, but is seen rarely now, save as in early April V-shaped flocks pass overhead on the way to the Hudson Bay country. Geese and pelicans seem to fly against the very heavens, but the flight of the majestic swan is far higher. When they reach an unfrequented region, they descend gradually, flying round and round in large circles nearer and nearer the earth until, if no sign of danger be seen, they alight. The trumpeter stands five feet high. The color, save black bill and legs, is snowy white. The whistling swan is a trifle smaller.

There are numerous world species of swans, including a proverbially impossible black swan produced by Australia. The swan of literature is still found wild in the more desolate parts of northeastern Europe and northern Asia. Though a hissing, pugnacious, quarrelsome bird, it is an indispensable ornament of ponds and streams in the private and public grounds of Europe. It has been introduced widely in America. The typical nest of a swan is a wide mass of rushes and reeds, lined with down, near the water's edge, preferably on an islet. The female lays from five to seven dull greenish white eggs four inches long. The long, graceful neck of the swan contains twenty-three vertebrae. It is designed to fish up the roots and seeds of aquatic plants, though snails and small shellfish generally are not at all amiss. The young of the swan, called cygnets, have bluish gray plumage.

The proverbially graceful carriage of the swan in the water merits the following couplet from Wordsworth's *Yarrow Revisited:*

> The swan on still St. Mary's lake
> Float double, swan and shadow.

To the ancients the swan was known as the bird of Apollo. In some way a tradition arose that the dying swan sang with remarkable musical power. Shakespeare, himself called the "Sweet Swan of Avon," used the tradition in the *Merchant of Venice,* "Makes a swan-like end, fading in music," and again in *Othello,* "I will play the swan and die in music."

Swearing. See OATH.

Sweat. See PERSPIRATION.

Sweat-Shop, a private room, house, or tenement, not a factory, in which piecework is carried on. The term is used most frequently in connection with the manufacture of ready-made clothing, but a sweat-shop is any private room, not a factory, in which piecework is done, and sweating applies not only to tailoring but to any kind of work brought home to be done by the piece. Some account may be read, under the heading FACTORY SYSTEM, of the evils that grew up in towns following the change from the domestic to the factory system of spinning and weaving. The sweating system is a return, in a way, to the domestic system, under city—not rural—conditions. A concrete example will illustrate the working of the sweating system. A New York wholesaler desires, let us say, 20,000 suits of a given style such as is designed to sell at retail for $50 the suit. He makes his wants known and invites bids. He enters into a contract with the lowest bidder. Or the manufacturer solicits a contract to supply suits according to sample. He puts his price down to make the sale. In either case the contractor buys material at wholesale and, instead of manufacturing in a factory in the daylight, he farms out his work. To a cutter or group of cutters he issues material and pays by the piece for cutting out vests; to others he gives the cutting of trousers, coats, etc. The cut garments are brought to the contractor, who reissues them, with the addition of buttons, buckles, thread, etc., to be sewed at so much the garment. He does not go about soliciting laborors; he simply offers piecework at starvation wages, and the poor come for the work, carry it to their homes, such as they are, and return the complete garment for inspection.

We are accustomed to dwell upon the plenty that prevails in this country without realizing that our large cities contain enough misery to out-Europe Europe itself. The throngs that file through the offices of these contractors tell the story. Cutters as colorless as vegetation grown in a cellar,

worthy men laboring literally day and night to support a family, inebriates starting up after a day of stupid debauch, widows, when they ought to be asleep, sewing to pay rent and keep their children from the poorhouse, the aged, the needy, not dozens,—thousands and thousands of them,—stand in line and exchange their bundle of completed work for huge bundles of material and a little coin. The hectoring, brow-beating, "fining," and threats of refusal to give out more, not to say the language addressed to women and young girls, have been represented by investigators in terms that make human slavery seem decent, humane and desirable.

Sweating prevails in the large cities we may say, of the world. London is considered a center of the system.

The sweat-shop clothing industry of America employs hundreds of thousands of persons, to say nothing of other lines. Over half of the ready-made clothing of American men, women and children is made in sweat-shops. The leading states have enacted laws regulating sweat-shops. See Wages.

Sweden, a kingdom of Europe occupying the eastern part of the Scandinavian peninsula. The native name is Sverige. The latitude of Sweden is about the same as that of Alaska. It has a direct coast line of 1,550 miles, which, by including gulfs and bays, is more than doubled in length. The surface slopes gradually to the east, and is approximately evenly divided between highland and lowland. The highest mountain peak is Mt. Kebnekaise, 7,024 feet high. One-tenth of the area is covered by lakes, the two largest being Vänern and Vättern. The largest waterfall in Europe is found in Sweden. It is called Njuomelaska. It consists of two cataracts of 103 feet with a descent of 150 feet more in the course of one and one-third miles. Two other falls in Sweden have a height of 100 feet or more. The largest river is the Tornea.

Rocks and Minerals. The fundamental rocks of the country are of three varieties: the gray gneiss, containing such minerals as the garnet and the graphite; the red iron gneiss, in which, however, no iron mines are found; and the granulite, containing Sweden's richest mineral deposits, which are iron ore, copper pyrites, and zinc blende. Many parts of the country abound in granite, sandstone, red and gray limestone, and greenstones. Mining is engaged in extensively, and the excellent iron ore obtained from the Swedish mines is largely used in the manufacture of the highest grade of steel tools. The mines at Dannemora are the most noted.

Climate and Vegetation. The climate is varied, being arctic in the extreme north and mild as the climate of middle Europe in the south. As a partial evidence of its salubrity, it may be stated that the average length of life is 52.3 years, and that the death rate is low, being in 1919 14.4 per thousand. Birch thrives as far north as the 69th parallel, pine and hemlock as far as the 65th, rye the 67th, oats the 65th, fruits the 65th, wheat the 63rd, elm, oak, and basswood the 61st. More than one-half of the entire area of the country is covered with valuable forests of fir, birch, and pine. Lumbering is a big industry, and lumber products are the chief articles of export. The lumber is especially noted for hardness and durability.

Animals. The animal life of Sweden shows almost as great a diversity as that which exists between Massachusetts and that of the Rocky Mountains. In the mountains of the extreme north, the wild reindeer, glutton, arctic fox, ptarmigan, and the bear may yet be found. The wolf and the fox sally out into the cultivated lands, particularly in the winter time. The lemming, various squirrels, the woodpecker, the wood grouse, as well as the roedeer and the reindeer, may be found in the forests. The field mouse, the dormouse, the hedgehog, together with the marten, the weasel, and the badger, are found in farming districts. Most of the perching and singing birds of Europe, including the cuckoo and the nightingale, nest in Sweden. Several owls, hawks, and eagles are common. The inland lakes and the coasts of the Baltic are noted for waterfowl. The woodcock, the snipe, and other wading birds are abundant. Flocks of swans, herons, cranes, ducks, and geese migrate to southern Sweden on their way to and from their northern nesting places. The rivers and

lakes are well stocked with fish. The fisheries of the Baltic are noted for herring, codfish, and mackerel. In all, about one hundred forty kinds of fishes are found in Swedish waters.

Occupations. Agriculture is the leading industry of Sweden. The most common crops are oats, rye, barley, wheat, and potatoes. Much live stock is also raised. Butter is exported to Great Britain. Orchards are common. Almost one-third as much land as is devoted to agriculture is planted to orchards. Comparatively speaking, Sweden is not a manufacturing country, but iron works, woolen mills, and match factories are important factors in considering the occupation of the people. The railways also employ a large number of men, the railway system being very large in proportion to the population of the country. The trunk lines are owned by the state, but branch lines and short lines are as a rule built by private companies. A line built from the Gulf of Bothnia to the Norwegian coast is the first railroad of the world to cross the Arctic Circle.

Area and Population. The country is sixth in size of European states. The average population per square mile is about thirty-one, very nearly the same as for the world as a whole. The largest three cities are Stockholm, the capital (population 419,429), Gothenburg (population 202-366), and Malmo (population 113,558). Since 1851 the emigration from Sweden has been tremendous. About 22,000 have left their native shores annually. The bulk of this emigration has been to the United States, where the Swedes have settled mainly in the North Central States. Denmark, Norway, and Germany have also received small accessions from this stream of emigration. An attempt made in recent years to divert a part of this emigration to Argentina has not proved successful. About one-fifth of the loss in population sustained by emigration has been offset by immigration.

Government. Sweden is a constitutional monarchy. The executive council consists of seven heads of departments and three consulting councilors, one of whom is president of the council. Its legislative body (Riksdagen) consists of two chambers, and meets annually. Members of the first chamber are elected for nine years and serve without pay. Members of the second chamber are elected for four years. The administration of justice is vested in lower courts of different rank. From these appeals may be taken to one of the three superior courts of the country. Further appeal may be taken to the supreme court, whose decisions are issued in the name of the king. The army in time of peace numbers about 21,500. Between the ages of twenty-one and twenty-five every able-bodied man must spend a certain time each year in camp learning the art of war. The largest vessel in the navy is *Drottning Victoria*. The money unit of the country is the krona, worth about twenty-six cents of American money.

Education. Elementary education is compulsory, and the laws are strictly enforced. The percentage of illiteracy is very low. Secondary schools are established in the populous centers. The country supports two universities, one at Upsala, founded in 1477, generously endowed by Gustavus Adolphus, and the other at Lund, founded in 1668. Besides these, there are a number of other government schools, such as normal schools, technical schools, agricultural schools, schools for the blind, the deaf and mute, and naval and military academies. An institution, known as the Swedish Academy, limited to eighteen members, is charged with the function of promoting the development of the Swedish language and its literature.

History. The early history of Sweden dates back to a period before the beginning of the Christian era. The northern part of the country was peopled by the Svea, or Swedes, and the southern by the Göta, or Goths. The latter appear to have been an offshoot of the former. The Goths were migratory, adventurous, and warlike; the Swedes restless, courageous, and indomitable. Gradually the Swedes established their supremacy in the country, and bands of Goths at different times migrated to Germany and Russia, and their descendants in turn invaded the Roman empire. The government of the country was tribal, and for hundreds of years these tribal chieftains were at war with one another. At the time

of the age of the vikings (800-1000), when sea rovers from Sweden, Norway, and Denmark plundered the coasts of France, Germany, Italy, England, Scotland, and Ireland, some of the more powerful chieftains conquered adjoining territory and built up small kingdoms. Such kingdoms centered around places like Upsala and Lund. The Upsala kings were the first to succeed in building up a native kingdom. The Danes overwhelmed the southern kingdom with Lund as its capital, and maintained their supremacy there for many centuries. Christianity was introduced into Sweden during the middle of the ninth century by St. Ansgar. A struggle between Christianity and paganism followed which lasted for almost 300 years. During the next 400 years interest centers around the Crusades, two of which were undertaken against the pagan Finns, civil wars between rival houses for the throne, and the union of the three Scandinavian countries for a period of two hundred years with Denmark at its head.

Beginning with 1521 Sweden achieved its independence of Denmark under the leadership of Gustavus Vasa. During the reign of this great king the Reformation was established, and the country made independent of the Hanseatic League. Fifty years of internal struggles largely inspired by religious controversy followed, and the grandson of Vasa the Great, Gustavus Adolphus, became the king of Sweden. His varied activities during a short reign of eleven years include the organization of the judiciary, the reorganization of the army, the extension of commerce, the colonization of Delaware, the founding of a college at Vesteras, the endowment of the University of Upsala, and the military leadership of the Protestant cause during the critical period of the Thirty Years' War. After his death his able minister of state, Axel Oxenstjerna, brought to a partial realization, at least, many of his policies; and as a result, Sweden became for almost 100 years after the peace of Westphalia one of the great powers of Europe. The loss of territory on account of the unfortunate wars in which Charles XII became involved reduced Swedish influence on the continent, and the cost of a series of wars which lasted almost eighteen years drained the country of its resources, so that Sweden, weak in spirit and shorn of strength, was compelled to retire from her position of eminence and power. As the unnerved nation gradually recovered its balance, governmental autocracy was curtailed, principally through the wise measures of the able president of the king's council, Count Arvid Horn; economic conditions were improved by the introduction of manufacturing enterprises, largely due to the efforts of the Swedish philanthropist, Jonas Alströmer; scientific knowledge was diffused through such men as Polhem, Swedenborg, and Linnaeus; and the nobility was checked in its oppression of the common people by Gustavus III.

As Sweden became involved in the Napoleonic wars, she suffered the loss of Finland, but at the close of the wars she was reimbursed by receiving Norway. The Norwegians, however, did not accept their transfer from Denmark to Sweden without a struggle, but after a military demonstration by the Swedish king and an offer of arbitration, the union of the two countries was effected in 1814. This union lasted until 1905, when Norway effected a peaceful dissolution and established an independent kingdom. During the latter half of the nineteenth century a brilliant galaxy of men added luster to the Swedish name. The chemist, Jacob Berzelius, the botanists, Agardh and Fries, the zoölogist and archaeologist, Sven Nilsson, the inventor, John Ericsson, and the sculptor, Fogelberg, made valuable contributions to the world's progress along their respective lines. Among eminent men who at the present time are engaged in enterprises which are of interest to the world at large are Sven Hedin, the explorer of the Himalaya mountains, and C. Skottsberg, who has achieved distinction for his geological and botanical expedition to Magellan's Land. Of late years the discontent of the common people with their political conditions has affected the economic conditions of the country seriously.—S. A. CHALLMAN.

RECENT HISTORY. Sweden took no part in the World War, but its sympathies were so much a matter of question that in 1917 the allies, following the discovery that communications were going into Germany via the Swedish Foreign Office, became doubt-

ful of its neutrality. Post-war conditions were less chaotic in Sweden than in the central and southern European countries.

STATISTICS. The following are the latest reliable statistics to be had:

Area, square miles	173,035
Forest area, square miles	102,114
Population (1920)	5,903,762
Finns	25,290
Lapps	7,138
Chief Cities:	
Stockholm	419,429
Gothenburg	202,366
Malmö	113,558
Norrköping	58,101
Hälsingborg	47,074
Gavle	37,746
Number of counties (län)	25
Members of first chamber	150
Members of second chamber	230
National revenue	$255,000,000
Bonded indebtedness	$355,000,000
Farm area, square miles	15,576
Wheat, bushels	12,566,000
Rye, bushels	28,502,000
Barley, bushels	11,804,000
Oats, bushels	67,585,000
Sugar beets, short tons	104,456
Hay, tons	4,268,166
Domestic Animals:	
Horses	715,681
Cattle	2,550,828
Sheep	1,563,654
Swine	716,783
Manufacturing establishments	8,059
Operatives	392,531
Iron ore, tons	4,519,112
Pig iron, tons	470,550
Ingot iron, tons	230,900
Silver and lead ore, tons	2,901
Copper ore, tons	1,136
Zinc ore, tons	47,674
Manganese ore, tons	14,926
Suphur pyrites, tons	107,326
Imports	$316,000,000
Exports	$274,000,000
Miles of railway	9,420
Teachers in public schools	24,833
Pupils enrolled	708,821

See GOTHS; GUSTAVUS VASA; GUSTAVUS ADOLPHUS; THIRTY YEAR'S WAR; GUSTAVUS III; SWEDENBORG, EMANUEL; LINNAEUS; BERZELIUS; ERICSSON, JOHN; HEDIN, SVEN; TEGNER, ESAIAS; LAGERLÖF, SELMA.

Swedenborg, Emanuel (1688-1772), a Swedish theologian, was born at Stockholm. His father was chaplain to Charles XI, while on his mother's side he was a descendant of Gustavus Vasa. He was educated at Upsala for a scientific career, but this did not interest him. He went abroad for three years and studied chemistry, astronomy, physics, and mathematics at London, Paris, and elsewhere. In fact, from 1710 to 1745 he was an eminent scientist. He traveled extensively. He was for eleven years connected with the college of mines, became a fellow of the Royal Academy of Sciences in Stockholm, and wrote a score of works and treatises on air-pumps, flying machines, ear trumpets, canals, fire, color, coinage, the working of iron and copper, the circulation of the blood, and the make-up of the brain. He was, in short, one of the most active scientific men in Europe. He is credited with a number of suggestions relative to the heart, lungs, and blood that ripened in the minds of later investigators into admitted scientific facts. His aim was, if possible, to discover the soul.

In 1745 while in London he announced that the Lord had appeared to him for the third time and had given him spiritual insight, with a commission to write of the New Jerusalem and things spiritual. He withdrew from all worldly affairs, the Swedish government continuing his salary, and wrote a series of remarkable works, "as the Lord commanded me to write." The list of these works includes a score or two of volumes. One of the latest, a general exposition of the new theology, is the *True Christian Religion, or the Universal Theology of the New Church.* His followers are known as Swedenborgians, or as members of the Church of the New Jerusalem. There are about 8,000 adherents in the United States and Canada.

Swedish Literature. See LITERATURE.

Sweet Flag, an aquatic plant. A relative of jack-in-the-pulpit, but growing in shallow water. The yellowish green flowers are crowded on a tall scape with no covering, no pulpit. The leaves are sword-like, resembling those of the common blue flag. The thick creeping root-stocks have a sweet odor and a pungent taste. Boys like to carry bits in their pockets to nibble at. Candy makers use sweet flag as a flavor. It is used also as a perfume. The name comes from the flavor of the root and the shape of the leaves. Sweet flag grows in Great Britain, and in America from east Kansas and Minnesota to Florida and Nova Scotia. See PERFUMERY; OIL.

Sweet Pea, a fragrant member of the pea family. The sweet pea is allied closely to the wild peas one finds climbing over bushes and along copse edges. It is distinctly a climber and needs cool, moist soil. Sweet peas should be planted early to get a start before hot weather comes on. They do best in a north and south row, in which case their roots are less exposed to the sun. The roots should be flooded with water of an evening. The leaves should not be sprinkled. There may be some dispute as to order, but sweet peas certainly merit a place in the first dozen flowers noted for delicate fragrance. For an account of the curious corolla, see PEA.

Sweet Potato, a trailing vine related to the morning glory, moon flower, and cypress vine. It is not related to the potato nor to the yam, though often called a yam in the south, especially by the colored people. It is well to remember also that in the South potato means sweet potato—the others are called Irish or round potatoes. The sweet potato was found in cultivation by the Southern Indian, and is doubtless native to America. The vine seldom blossoms. It produces no seed. Field crops are planted by placing a layer of tubers in a hotbed and covering them with a few inches of sandy soil. Inside of a few weeks the bed will be full of sprouts which may be broken from the tubers and set in rows. If replaced in the hotbed, the tubers will bear a second crop of sprouts. A bushel of tubers will produce 3,000 to 5,000 sprouts. A little later, additional plants may be started by setting twelve-inch cuttings of the running vine. The latter are not so sure to live, but they produce quite as fine tubers.

Under improved facilities for transportation, there is a tendency to raise each vegetable where it grows best and ship it to market in less favored localities. A belt of fine sweet potato country runs around midway between the mountains and the sea through Mississippi, Alabama, Georgia, and North and South Carolina. This belt extends northward through Virginia into New Jersey. Texas and California are also large raisers of sweet potatoes. The Ohio Valley would feel slighted if left out of the list, but Georgia is the leading sweet potato state. Not less than 75,000,000 bushels of sweet potatoes are raised in the United States annually. Immense quantities are shipped to market in barrels, and twice as many would be in demand if some inexpensive method of preventing winter decay could be devised. Sweet potatoes are raised by over a million farms in the United States. At the last agricultural census 803,727 acres were given over to this crop; the yield was 78,091,913 bushels.

Sweet William, a vigorous, hardy, garden flower, allied to the pink. See PHLOX.

Swift, Jonathan (1667-1745), an English writer. He was born at Dublin. He was a rather prococious child, learning to read at a very early age. As an older boy, however, he was often considered dull, as he was a desultory student and regarded with independent scorn such of the prescribed studies as did not arouse his interest or meet with his approval. At the University of Dublin he received a degree by "special favor," a term implying a lack of proficiency. Having lost his father in early childhood, Swift's education was given him by the charity of an uncle, a fact very galling to his proud spirit.

On leaving the university Swift entered the family of Sir William Temple in the capacity of secretary, at a salary of twenty pounds a year. Later he took orders in the Irish church, and removed to a distant and secluded parish. He soon found the life unendurable and returned to his position with Sir William Temple. He now began political writing. Like De Foe, Steele, and Addison, he became a Whig pamphleteer. In 1710 he abandoned the Whigs, joined the Tories, and began writing in the interests of that party. In 1714 he was made Dean of St. Patrick's, Dublin, which position he held until his death. Here he did his greatest literary work.

All his writings were controversial, written to help a cause or party. In 1724 he averted a measure most disastrous to the welfare of Ireland and thereby won the love and gratitude of the people. The trouble which evidently he had long dreaded came upon him. Loss of memory was followed by insanity, and finally by idiocy. He died in 1745, leaving his fortune for the founding of an asylum for idiots.

As regards Swift's genius, his power, and originality as a writer, all are agreed. Of his character, there are various estimates. He has been regarded as utterly selfish, both in private and public life, while others believe him to have been moved by the noblest motives, but embittered by disappointments and suffering. It is beyond dispute that he strove eagerly for political preferment, that he firmly believed himself deserving of something better than he ever received, that his failures made him hard and envious. By those who knew him best, he was loved, esteemed, and pitied profoundly. His name will always stand among those of the great masters of English prose.

The Tale of a Tub, published in 1704, is apparently a simple tale of Peter, Martin, and Jack—merely a thin veiling for the churches of Rome, England, and Scotland. Martin gets the better of his duller comrades at every turn. *The Battle of the Books,* described as taking place in a dusty library, was a defense of Latin and Greek learning. *Gulliver's Travels* is the greatest and most characteristic of his works. Swift made the statement in a letter that his purpose in writing the book was "to show his hatred of that detestable animal man." The *Journal to Stella* consists of a series of daily letters written to a young girl whose education Swift had superintended. The journal is a most interesting description of the daily life and experiences of a man of letters. The episode of "Stella" and another of a young girl whom Swift poetically calls "Vanessa" are sad incidents of his career. Both women appear to have been of high character and were devoted to the great man. "Vanessa," at least, is believed to have died of a broken heart. It has been stated that Swift was married privately to "Stella" in 1716, but he never acknowledged her as his wife, and it is said that after the marriage he never saw her except in the presence of a third person. That there is something sad and mysterious in the man's life cannot be doubted. The simplest explanation is that he was conscious of his growing tendency to insanity, that this knowledge embittered his existence and led him into the errors for which he is so greatly blamed.

QUOTATIONS.

Bread is the staff of life.
How we apples swim.
A penny for your thoughts.
The sight of you is good for sore eyes.
Fingers were made before forks.
A carpenter is known by his chips.
May you live all the days of your life.
I thought you and he were hand-in-glove.
She pays him in his own coin.
Hail fellow, well met.
To sow land with chaff.
To extract sunshine from cucumbers.
There is none so blind as they that won't see.
All the world and his wife.

SAID OF SWIFT.

An immense genius, an awful downfall and ruin. So great a man he seems to me that thinking of him is like thinking of an empire falling. —Thackeray.

Jonathan Swift, the greatest of English satirists, is the most powerful, most inscrutable, and most tragic figure in the literary history of his century.—Pancoast.

"He moves laughter but never joins in it. He appears in his works such as he appears in society. All the company are convulsed with merriment, while the Dean, the author of all the mirth, preserves an invincible gravity and even sourness of aspect, and gives utterance to the most eccentric and ludicrous fancies, with the air of a man reading the commination service."—T. B. Macaulay.

He agitated kingdoms, stirred the laughter and rage of millions, and left to posterity memorials that will perish only with the English language. . . . Perhaps his chief service to us, as his chief legacy to the race, is indirect,—the warning spectacle of his powerful and mournful genius, with its tempest of hopes and hatreds.—Welsh.

Hater of his race and lover of individuals.—Tappan.

The most agreeable companion, the truest friend, and the greatest genius of his age.—Joseph Addison.

Swift was in person tall, strong and well made, of a dark complexion, but with blue eyes, black and bushy eyebrows, nose somewhat aquiline, and features which well expressed the stern, haughty, and dauntless turn of his mind. He was never known to laugh, and his smiles are happily characterized by the well known lines of Shakespeare, —indeed, the whole description of Cassius might be applied to Swift:

He reads much:
He is a great observer, and he looks
Quite through the deeds of men: . . .
Seldom he smiles, and smiles in such a sort
As if he mocked himself, and scorned his spirit
That could be mov'd to smile at anything.
—Walter Scott.

Swift found neither a cause to cherish nor a doctrine to establish; he employs the whole force

of an excellently armed mind and a thoroughly trained character in decrying and destroying.—Taine.

He rests where the cruel hate of envy cannot tear his heart.—Swift's Epitaph.

Swift, a family of birds related to that of the hummingbird, but having a strong outward resemblance to the swallow. There are seventy-five species, four North American. They were originally inhabitants of hollow trees and caves, but they are now disposed to seek shelter in buildings. The common swift has adapted itself to new conditions. It builds a bracket-like nest of twigs, glued together with a sticky saliva and attached to the inside of a chimney,—hence the popular but incorrect name of chimney-swallow. Chimney-swift would be more appropriate. The swift has long, pointed wings, curved backward, and has a compact, trim body riding between them. They give the appearance of a tiny bow and arrow when the owner is sailing at a great height, as is its custom of a morning or fine evening. Frequently several nests are made in the same chimney, and occasionally large colonies occupy disused factory chimneys or mill stacks. The swift clings to a wall by small, weak feet, using its tail as a prop, woodpecker fashion. It feeds on insects caught in midair. Its plumage is compact to offer little resistance in swift flight, and, as might be expected from its nesting place, is of a sooty brown, grayish on the throat. Eggs, four to six, white. The edible nest used by the Chinese for soups is made by a species of swift that inhabits the cliffs of Asiatic coasts. See SWALLOW; MARTIN.

Swift. See LIZARD.

Swimming, the art of floating and propelling the body in the water. Many animals, as waterfowl, swim naturally. Nearly all animals can swim for short distances. Rats swim well, but mice and moles soon drown. Large animals of the cat tribe, as the tiger and the lion, are good swimmers, but the house cat hates to wet her feet and can swim but a short distance if compelled to take to the water. All the four-footed domestic animals can swim.

The elephant swims more easily than it walks. It simply stands upright and treads water. Animals of the deer tribe are excellent swimmers. Some quadrupeds have become so accustomed to swim that their limbs are no longer fit for use on dry land. The whale, the manatee, the seal, and the walrus are familiar examples. Fur-bearing animals swim and dive with ease. Man and monkeys are said to be the only animals to whom swimming is entirely artificial.

The body of man is slightly lighter than water. Swimmers claim that by closing the mouth and throwing the head back, it is possible to rest motionless, with the nose above the surface of the water. In swimming, man imitates the motions of the frog more nearly than those of any other animal. Progress is made by thrusting the arms in front and giving them a sweeping motion backward. In swimming, also, the legs are drawn up to the body, thrust outward and backward and then brought together in such a way that the water escaping from between them gives the body a forward motion. The best swimmers in the world are the natives of the Pacific Islands. Both young and old seem to swim almost as naturally as dolphins. They take the greatest pleasure in surf bathing.

Among the world's swimming records are 100 yards by J. H. Derbyshire, an English amateur, in one minute; a mile by Richard Cavill in 21 minutes 11⅖ seconds, and 40 miles by Captain Webb in 9 hours 57 minutes. Miss Agnes Beckwith has a 20-mile record of 6 hours 25 minutes. Captain Webb has crossed the English channel, a distance of 20 miles, increased to 35 miles by the tides, in 21 hours 45 minutes.

See DIVING.

Swinburne, Algernon (1837-1909), an English poet and essayist. He was born in London. He studied at Oxford, but he left without taking a degree, and began at once publishing poems which for some time attracted no attention. He was associated with Dante Rossetti and Walter Savage Landor, and was an admirer of Victor Hugo. His first work to attract attention was *Atalanta in Calydon,* published in 1862, in which he displayed that facile metrical invention for which he is celebrated, and in which he is almost unequaled. Other writings of Swinburne's are *Poems and Ballads, Songs before Sunrise, Songs of Two Na-*

tions, A Century of Roundels, and *The Sisters.* Swinburne's critical writings do not display the quality of fine discrimination. He either over-praises or over-blames. He wrote eulogies on *Charlotte Brontë, Shakespeare, Ben Jonson,* and *Victor Hugo.* Swinburne's reputation as a poet rests upon his mastery of poetic form, in which respect he has been compared with Milton and Shelley. He has been called a "molder of exquisite melodies."

Swine. See Hog.

Swing, a seat suspended usually by cords, so as to move freely to and fro like a pendulum. Swinging was no doubt an early form of amusement. A cut on a Greek water jar of the fourth century B. C. represents a lady seated in a swinging chair, while another, evidently a companion or servant, stands behind and sends her flying through the air, just as children swing each other nowadays. For want of ropes, colonial children cut off grape vines near the root and swung to and fro, clinging on with their hands; or two vines were cut off and bound together and provided with a seat. Were it not for the slight friction of the bending cord, and the resistance of the air, a swing would go on forever, but for the reasons mentioned, the "cat will die," if given time. It is quite possible for one who understands the method to keep himself going, and even to increase the height to which the swing rises. By standing up and facing each other two persons can do this more successfully than one. Although centrifugal force prevents a person from dropping out of the seat, the swing should not be permitted to pass through much more than one-third of the circumference of a circle. In order that a swing may go to and fro in a straightforward manner, the upper ends of the cord should be fastened on an exact level with each other. The trapeze and similar pieces of apparatus familiar in the circus and the gymnasium have grown out of the swing.

Swiss, a semi-transparent muslin, light in weight and finished with considerable starch. It is usually woven plain, but is sometimes ornamented with embroidered dots or figures. The finer grades are used for women's and children's summer dresses; coarser qualities for curtains and draperies. The manufacture of this fabric originated in Switzerland but is by no means confined to that country at the present time. A fabric similar to Swiss, but somewhat coarser, is called tarlatan. See Embroidery.

Switzerland, a republic of central Europe. Speaking roughly, it occupies the region of the Alps between the confines of Italy, France, Germany, and Austria. It has no seashore. Area, 15,976 square miles—twice that of New Jersey. Population, 3,880,720. The republic consists of twenty-two cantons. The capital is Berne. Each canton sends two members to an upper house. One hundred eighty-nine delegates, one for each 20,000 people, are sent to the lower house or National Assembly. Clergymen may not serve. Instead of a president, a federal council of seven members is chosen by the Assembly for a term of three years. These seven members form a cabinet and elect a presiding officer. Each conducts a department of the government. A vote of the people, a referendum, is necessary for the passage of any important measure. In 1908, for instance, the people forbade the further use of absinthe. As far as known to history, the early inhabitants of Switzerland were the Rhaetii and the Helvetii. About 58-15 B. C. the Romans subdued these tribes and established the province of Helvetia. The conquerors built military roads—one over the Great St. Bernard—and established fortresses around which many towns and villages grew up. Many traces of Roman occupation may yet be seen.

About 400 A. D. irruptions of barbarians swept over the land. The Burgundians occupied the western portion. This section of Switzerland uses the French language. The Ostrogoths settled in the south. This section now speaks Italian or an allied language. The Allemani occupied north Switzerland, the inhabitants of which, fifteen cantons strong, now speak German. The Swiss people are therefore of three quite distinct race elements. The Swiss republic is a product of the Alps, a confederation of diverse elements, owing its independence to the difficulty of subduing mountain-bred, mountain-loving people.

At times, Switzerland was divided up between surrounding nations and again the

IN THE SWISS ALPS

PALU GLACIER

It has a movement of from 18 to 24 inches a day.

A DANGEROUS EXPEDITION

The members of this exploring party are fastened together by a rope for safety; they encounter many deep and forbidding crevasses.

spirit of independence asserted itself. Notable victories were won over the House of Hapsburg and the Austrians at Morgarten in 1315 and Sempach in 1386. The national legend of William Tell belongs to this period. Charles the Bold and the Burgundians were routed with slaughter at the battles of Granson and Nancy in 1476. The Swiss bore home so much booty from their Burgundian campaign that a love of foreign luxury crept in. The Swiss became eager to serve for pay in foreign armies, giving rise to the saying, "No silver, no Swiss." They formed the best soldiery to be had for hire. The Swiss guards of Louis XVI immortalized themselves by dying in defense of the Tuileries.

Christianity was introduced at an early date from France and Ireland. At the time of the Reformation most of the German and a part of the French cantons became Protestant. Jealousy gave rise to bitter civil wars. After many vicissitudes the republic was established and guaranteed independence. The present constitution was adopted in 1848. French is the official language at the capital. Laws are published in all three languages. About fifty-one per cent of the inhabitants are now Protestant, forty per cent Catholic.

The dress, customs, and occupations of the cantons differ greatly. Some cantons are devoted to herding; others are engaged in manufacturing or agriculture. Lumbering is an important industry. By frugality a large population is maintained in comfort. Every square foot of productive ground is utilized. Husbandmen clamber down almost inaccessible precipices for an armful of wild hay. Patches of level stone the size of a bedquilt are covered with earth from the valley and are sowed to wheat. Bread, fruit, honey, vegetables, eggs, poultry, and dairy products are the food of the people. Good health and vigor are the rule. The houses are built chiefly of hewed or sawed fir logs which turn in the sun to a rich tan color. The appreciative observer and admirer of the natural and picturesque cannot fail to admire the wide-roofed Swiss chalet, as the mountain cottage is called.

The chief exports are honey, watches, silks, lace, cheese, condensed milk, leather, and wood-carving. Imports of glass, pottery, raw silk, woolens, oils, and shoes are heavy. The French franc is the coin of accounts. Lands are held in what is known as peasant proprietorship. About thirty per cent of the country is too rocky to produce trees or pasturage. About $25,000,000 a year is derived from tourists.

The republic owns the railroads, telegraph and telephone lines, and the express system. There were in 1920, 3,915 miles of railroad. Express rates are very low. Rates for other public utilities are proportionately low, and in this country government ownership and control has proved entirely successful. On the railroads monthly and even yearly tickets are sold, these tickets also including transportation on lake steamers where and when that is necessary. Of late years electrification of railroads has gone forward rapidly and new plans for electrification are continually being made. After the World War the exchange rate for Swiss money was so high that neighboring countries could not use the Swiss routes for through shipments, and business declined; but railroad equipment and roadbeds were not on that account permitted to deteriorate. In addition to government ownership, government control of corporations is very much closer than in America. Any two stockholders in a corporation may call for an examination of the company's books. It is a penitentiary offense to obscure accounts or refuse stockholders the privilege of examination.

In educational affairs each canton maintains its own schools. In all the cantons primary instruction is free. In 1874 elementary education was made obligatory, though this law was not always enforced in Roman Catholic cantons. There are also secondary schools for youths from twelve to fifteen. There are seven universities, to which women are admitted. Owing to the comparative freedom from tyranny, Switzerland has been for centuries the refuge of thinking people, not criminals, who got into trouble at home. During the World War Switzerland remained neutral.

STATISTICS. The following are the latest statistics to be had from trustworthy sources:

Area, square miles	15,976

Forest area, square miles	3,290
Population (1920)	3,880,320
Foreign born (1920)	412,306
Chief Cities:	
Zurich	207,161
Basel	135,976
Geneva	135,059
Bern	104,626
St. Gallen	70,437
Lausanne	68,533
Winterthur	49,969
Luzerne	44,029
Number of cantons	22
Members of senate	44
Members of chamber of deputies	189
National revenue	$80,000,000
Bonded indebtedness	$350,000,000
Farm area, acres	4,615,680
Tobacco, pounds	860,000
Sugar beets, short tons	9,370
Corn, bushels	218,000
Rye, bushels	1,559,000
Oats, bushels	3,036,000
Domestic Animals:	
Horses	129,269
Mules	3,581
Donkeys	891
Milk cows	729,999
Other cattle	1,382,116
Sheep	240,553
Goats	333,852
Swine	546,112
Manufacturing establishments	8,787
Operatives	381,170
Number of clocks exported	13,729,870
Output of beer, gallons	23,383,536
Imports	$455,000,000
Exports	$425,000,000
Miles of railway	3,915
Teachers in public schools	19,054
Pupils enrolled	594,827

Sword, sōrd, a well known weapon of warfare. It may be defined as a sharp blade of metal, having a hilt at one end, and designed to be used by a swinging motion of the whole arm. As to antiquity, it is believed that the making of swords was one of the first uses to which metals were put. The Assyrians, Greeks, and Gauls were known to have made both straight and leaf-shaped swords of bronze before the art of tempering steel was discovered. The Roman legionary carried a stout, two-edged sword of steel. Some of these swords were made for striking only; others for both cutting and thrusting; but none appear to have provided the grasping hand with an adequate defense. The crosspiece, the basket, and the gauntlet appear to be medieval additions.

The swords of Damascus and Toledo were noted for quality. A Damascene or Toledo blade could be sprung until the point touched the hilt without breaking. Many swords have special names, as the rapier, a long, slender dueling sword, and the broadsword, a heavy blade for a downright stroke. Various peoples had swords of special form or name. The Scottish claymore was carried by the Highlandman; the curved scimitar by the Saracen. The Turk invented the yataghan; the Frenchman, the sword bayonet. The Malay used to sharpen his sword on one side only, giving it a chisel edge.

Down to a late date, the wearing of a sword was the mark of a gentleman. It is now confined to military circles. Men in the navy carry cutlasses, or short, heavy-backed swords useful at close range. Cavalrymen carry sabres. The machete (mâ-shā′tā), a short, strong sword, practically a heavy knife, is popular in Central American countries. Its use shades off from that of a sword into a corn knife. It is well nigh a case of a sword beaten into a pruning hook, for the Cuban cuts cane with it and the Nicaraguan cuts off his bunches of bananas with a machete.

Swordfish, a fierce, active sea fish, ten to twenty feet long. Its upper jaw is prolonged into a long sword-like weapon which its owner employs in the destruction of larger fishes. A sword-fish does not hesitate to attack a whale. It has no difficulty in piercing the side of a rowboat and has been known to bury its sword in the timbers of a passing ship. The British museum has a piece of ship's timber containing the "sword" of one of these fishes. A section of a three-inch oak plank sheathed with copper, and having the sword of a swordfish sticking clear through it, is shown at Singapore. It is a bluish fish found in Atlantic waters. It is not without value as a food fish. The chase of the swordfish is a source of profit in the Mediterranean. New England fishermen take 1,500,000 pounds a year. The industry is worth $90,000 yearly.

Sybaris, a Greek colony in southern Italy. It was founded by Achaean colonists 720 B. C., and was destroyed by a rival city 510 B. C. It was the largest Greek city in what was known as Magna Grecia.

Its walls were several miles in circumference. It exacted tribute from twenty-five cities and ruled four neighboring tribes. The historian Strabo states that in the great war with Crotona in which Sybaris was destroyed, the city put not less than 300,000 men in the field. The enemy destroyed Sybaris finally by damming up a river and turning its current upon the walls of the doomed city. The wealth and luxury of Sybaris are proverbial, giving rise to the epithet, "sybarite."

Sycamore, sĭk′a-mōr, a massive American forest tree. Also known as buttonwood, buttonball, and American plane-tree. The name sycamore is applied also to a British maple and a spreading Egyptian fig tree. There are several sycamores in North America, including those of the Pacific coast and Mexico. The sycamore of eastern North America is a magnificent tree, the tallest deciduous tree in our forests. It grows from 60 to 170 feet in height. The creamy, satiny bark of the branches when without leaves and the mass of wide leaves when in foliage render it a handsome tree in all seasons. Small, greenish flowers in close globular heads are followed by similar heads of fruit that hang all winter. Owing to his great height, and also in compliment to his bearing, the Honorable Daniel Voorhees of Indiana was called the "Tall Sycamore of the Wabash."

Sydney, the capital of New South Wales, is also the oldest city in Australia. It is situated on the southern shore of Port Jackson, about eight miles in from the sea. Sydney harbor is entered through a narrow strip of water, and the gateway is dominated by two lighthouses; the harbor is fortified, and is so deep and commodious that it is the principal British naval base in Australia.

Descriptive. Old Sydney is rapidly disappearing, small, out-of-date buildings being replaced by new ones, narrow streets giving way to streets that are broad and well paved. The leading office buildings closely resemble the more modern structures to be seen in Europe and America, and other signs of material advance are in evidence.

Of first note among Sydney's buildings as well as among institutions, is the University of Sydney, overlooking the city from an eminence in Victoria Park. The municipal buildings, post office, National Art Gallery, Anglican and Roman Catholic cathedrals, Mechanics' Institute, custom house, public schools, denominational colleges, and theaters, are all worthy of note.

Sydney has about 800 acres of parks, as well as good beaches and the largest botanical garden in Australia. Sydney Centennial Park is the largest, but the smaller parks are very attractive.

Industry and Commerce. Sydney becomes more important each year as a manufacturing center. Meat packing is an important industry, and there are factories for the production of glass, pottery, stoves, boots and shoes, brewery and distillery products, cars, wagons, tobacco products and a number of other articles.

Sydney harbor has about 25 miles of wharves, and the harbor equipment includes dry docks, loading and unloading derricks, storage sheds and other improvements. The city and harbor are protected by modern forts.

History. In 1778 a party of English settlers landed at Botany Bay, 7 miles from the present Sydney; displeased with the location, they moved to the site of the city, making a permanent settlement. Sydney's early growth was slow, but after 1850 increase was rapid. The city and its suburbs had 897,640 inhabitants in 1921.

Syllogism, sĭl′lō-jĭzm. See Logic.

Sylvanus, or **Silvanus,** sil-vā′nus, in Roman mythology, a god of the woods and fields, frequently mentioned with Faunus and, like him, sometimes confounded with Pan.

Symphony, a musical composition for full orchestra, usually with four movements, though it need not have more than three. Hayden established the conventional form of a symphony, that is, the four movements in the following order: First, an allegro, or quick movement; second, an andante, or an adagio, the former being in moderate, even time, the latter considerably slower; third, a scherzo, or light, playful movement, and trio, or a minuet and trio; finally, an allegro as the close. Though this is the usual order, it is varied rather often. Beethoven was the great master of

the form. He has left nine great works of that character. Other writers of symphonies are Spohr, Shubert, Mendelssohn, and Schumann. Among modern composers stand Rubinstein, Brahms, Liszt, Tschaikowsky, and Dvorak.

Synagogue, sĭn′a-gŏg. See JEW.

Syndicalism, a type of radical trade unionism which, as commonly understood in America, aims to destroy the state as at present constituted, and make labor supreme. It had its origin in the French Confederation Generale du Travail (General Confederation of Labor), an organization of workers known for their advocacy of violence in the settlement of differences between capital and labor. "Briefly stated," according to a writer on *Socialism and Democracy in Europe,* "it is class war in its most violent form without the aid of parliaments and politics; with the enginery of the general strike and the spirit of universal upheaval and anarchy."

"Syndicalism," says John Spargo, a leading American Socialist, "is a form of labor unionism which aims at the abolition of the capitalist system based upon the exploitation of the workers, and its replacement by a new social order free from class domination and exploitation. Its distinctive principle as a practical movement is that these ends are to be attained by the direct action of the unions, without parliamentary action or the intervention of the state. The distinctive feature of its ideal is that in the new social order the political state will not exist, the only form of government being the administration of industry directly by the workers themselves."

In America the syndicalist movement is led by the so-called Industrial Workers of the World, or I. W. W., whose best known representative was William D. Haywood, who fled the United States as a fugitive from justice and went to Russia, where he became a supporter of the soviet or communist government.

The general strike, which is one of the weapons of syndicalists, may be defined as the cessation of labor by workers of many kinds for some economic or political purpose. As the term is now employed, such a strike is usually national in scope and the benefit sought is of wide application. Thus the Swedish general strike of 1909 was for more wages and shorter hours for working people in general. This was an economic strike, but proved a failure. The general strike advocated by the syndical- the reform of the electoral system, and was a success in that the government was obliged to take the matter up for consideration, which was all that the strikers asked. There have been a considerable number of these general strikes in recent years, since the World War, with varying results. The general strike in Belgium in 1913 was for ists, in America as in Europe, involves the cessation of all work for the purpose of destroying capitalism and establishing a new social and industrial order.

Synod, sĭn′ŭd. See PRESBYTERIAN.

Syracuse, N. Y., the county seat of Onondaga County, is at the geographical center of the state, 289 miles by rail from New York City. It is served by the New York Central, West Shore and Lackawanna railroads, and by six interurban trolley lines. The New York State Barge Canal, with a harbor in Syracuse, affords an important means of freight transportation connecting with the Great Lakes at Buffalo and the Hudson River at Albany.

Nearness to raw materials and access to the markets of the world have been factors in the industrial development of Syracuse. In pioneer days the manufacture of salt was a leading industry, but that has now become of secondary importance. Syracuse now has a highly diversified line of products, which include tool steel, automobiles, gears, differentials and transmissions, plows, typewriters, candles and stearin products, agricultural implements, heaters, high grade china ware, plumbers' supplies, steel furniture, clothing, shoes and many other articles.

Syracuse University, established in 1870, had an enrollment in 1922, of 6,422 students. Colleges of liberal arts, fine arts, law, medicine, engineering, agriculture, business administration, pedagogy, library economy and nursing, and a state college of forestry, comprise the equipment of the university. The University Carnegie Library, the Court of Appeals Library, the Medical College Library and the College of Forestry Library contribute to the facil-

ities for reading and study. There are three high schools and a total of 38 public schools; also twelve parochial schools. Other institutions of importance in Syracuse are the Museum of Fine Arts, Onondaga Historical Society, Onondaga Orphans Home, several Catholic orphan asylums, the tuberculosis sanitarium, the state armory, Y. M. C. A., and the Y. W. C. A.

The sixty-one parks and several recreation grounds have a combined area of 361 acres; Burnet Park (123 acres) and Lincoln Park (20 acres) are the largest. Numerous monuments have been erected, the principal one being to the memory of the soldiers and sailors of the Civil War. Since 1890 the state fair has been permanently located in Syracuse upon land about 120 acres in extent.

Syracuse is supplied with electric power by the Niagara and Salmon rivers. It is the center of a rich dairy and farming community.

The Onondaga Indian reservation is located near Syracuse. In 1778 the state purchased a large tract of land from these Indians by treaty. The first white settlement was made in 1805. Syracuse was finally named for the city of that name in Sicily. In 1825 it became a village and in 1847 was chartered a city. Population in 1920, 171,717.

Syracuse, sĭr′a-kūs, an ancient city of Sicily. It was situated at the extreme southeastern corner of the island. In the days of Greek colonization Syracuse was a Greek city. It was founded by Greeks from Corinth about 734 B. C. It was at one time the largest and wealthiest commercial city in the world. As an intellectual center, Syracuse vied in its prime with Athens and Alexandria. There were half a million inhabitants. Remains may yet be seen of a Greek temple, baths, and theater. The present town has a population of about 32,000. It is a center of trade in olive oil, lemons, and oranges. A local movement has been established for the preservation of coins, sculpture, and other relics of antiquity. See ARCHIMEDES; THEOCRITUS; DIONYSIS; SICILY.

Syria, sĭr′ĭa, or **Assyria,** anciently, a region rather than a country lying between the Mediterranean and the Euphrates, Asia Minor, and Arabia. Until the close of the World War it was a part of Turkey in Asia. The Syrians are a Semitic race related to the Arabians and the Jews. The great pathway from Egypt to Babylonia lay through Syria. The history of Syria is largely that of a change of masters. It was subject successively to the Assyrians, to the Persians under Cyrus, and the Greeks under Alexander. On the division of the latter kingdom, the family of Seleucus established a kingdom with the capital at Antioch. The Romans were the next masters.

At the division of the Roman world Syria naturally formed a part of the Eastern Empire. It was overrun by the Arabs in 636 and was taken from them by the Turks in 1070. Though held in part by the Crusaders, and later by the Mohammedans of Egypt, it is now a part of the new state of Palestine. The Syrians early adopted Christianity. The Bible was translated into the Syrian tongue. The present inhabitants of Syria are descendants of Syrians, Jews, Turks, Arabs and Greeks. Many portions of the country are fertile. Now that property will be secure, it is believed that prosperity will come. The introduction of machinery and railroads has done something to improve the country. See DAMASCUS; LEBANON; TURKEY.

STATISTICS. The following are the latest reliable statistics to be had:

SYRIA	
Area, square miles	60,000
Population	3,133,500
Chief Cities:	
Damascus	250,000
Aleppo	250,000
Beirut	180,000
Hems	70,000
Hama	60,000
Number of territories	4
Farm area, acres	3,840,000
Tobacco, pounds	3,000,000
Olives, tons annually	158,000
Grapes, tons annually	345,000
Domesic Animals:	
Horses, mules and donkeys	270,000
Camels	200,000
Cattle	500,000
Sheep and goats	4,800,000
Imports	$30,000,000
Exports	$10,000,000
Miles of railway	1,660

T

Tabard, an outer garment. The tabard worn by the plowman in Chaucer's *Prologue to the Canterbury Tales* was a rough cloak of heavy woolen material used by working people as a protection against severe weather. The military tabard of the fifteenth century was a loose shirt-like garment, having usually short sleeves or none at all, worn over the armor. It was customarily embroidered with the family arms of the wearer. About the middle of the sixteenth century it ceased to be worn, except by heralds. The painter Vandyke has left a drawing of two English heralds of the seventeenth century clad in their official tabards, decorated with the arms of their sovereign. In *Marmion* Scott speaks of the tabard as the distinctive dress of the herald:

> Two pursuivants, whom tabards deck
> With silver scutcheon round their neck,
> Stood on the steps of stone.

The Tabard Inn, from which Chaucer's Pilgrims started on their trip to Canterbury, stood south of the Thames in the suburb of London known as Southwark, near the road for Kent. It took its name from the picture of a tabard on the signboard. The old hostelry was torn down in 1866 to make room for a freight depot.

Tabernacle, a tent, pavilion, or booth. In sacred history the tabernacle was a tent built as a portable sanctuary for the Jewish nation. The construction of this tabernacle of the congregation is described fully in Exodus xxv-xxvii and xxxvi-xxxviii.

This Jewish tabernacle was quite a considerable affair. The tabernacle proper was of a rectangular shape, measuring about forty-five by fifteen feet and fifteen feet in height. This tent was surrounded by an inclosure or yard about 150 feet long and seventy-five feet wide. A curtain or screen, somewhat higher than the head of a man, surrounded the outer yard.

The tent proper was divided by a veil into two chambers, an outer and an inner. The inner chamber was called the "holy of holies." Here the ark of the covenant and the mercy seat stood. The altar of incense, the table of shewbread, and the golden candlesticks stood in the outer chamber. An altar of burnt offerings and a laver for the washing of hands stood in the outer yard.

The Israelites carried the tabernacle with them throughout their wanderings. Wherever they stopped the tabernacle was set up and the tribe pitched their tents about it in regular order. After the Israelites reached the Promised Land they set up the tabernacle in various places but chiefly at Shiloh. On the completion of Solomon's Temple the sacred vessels that were in the tabernacle were all removed by the Levites to their permanent resting place.

The term "tabernacle" has been applied variously. In Biblical phrase, the human frame, being the abode of the soul, is spoken of as the "earthly tabernacle" as in II Cor. v:1, "For we know that if our earthly house of this tabernacle were dissolved we have a building of God, an house not made with hands, eternal in the heavens."

The Whitefield Chapel in London was known as the Tabernacle. The large church which Spurgeon's congregation built in the Newington district of London was known as the Tabernacle. Talmage and his congregation built a Tabernacle in Brooklyn.

Table d'Hôte. See HOTEL.

Table Mountain, a flat mountain forming the southern terminus of the South African tableland. It is about 3,582 feet above sea level. It overlooks, almost overhangs, Table Bay and the port of Cape Town. Quite in keeping with the name the white fleecy clouds which overspread the "Table" in fine weather are called the "table cloth."

Taboo, among the Polynesians of the South Pacific, a practice of setting aside certain things as forbidden or sacred. "The Tahitians never repair or live in the house of one who is dead; that and everything else belonging to him is tabooed," says Spencer. Taboo, in such a case, is declared by common consent; it may be pronounced by a chief or a priest, or even by a private person, but with less effect. Some words may not be spoken; they are sacred, ta-

booed. A person may be placed under a ban, declared unclean, tabooed. The term has passed into our English vocabulary, but without the notion of awe. Thus we may taboo politics, or even taboo a person as one not to be mentioned or admitted to social intercourse.

Taché, Alexander Antonin (1823-1894), a Canadian Catholic archbishop of Manitoba, was born at Riviere du Loup, Quebec, and received instructions at Saint Hyacinthe College, Montreal Theological Seminary and Chambly College. From 1842 to 1844 Taché was instructor in mathematics at Saint Hyacinthe College, but in the latter year he began his novitiate in the Order of the Oblate Fathers. In 1845 he volunteered for missionary work among the Indians and half-breeds of the Red River Valley, and after reaching Saint Boniface he was ordained a priest.

Taché was soon well known for his good offices among the people on the Red River and for the tireless energy and good will he displayed in traveling great distances to perform them. He went to France in 1851, but returned to Canada two years later as bishop of Saint Boniface. He urged the Dominion goverment to adopt a conciliatory attitude toward the Indians and half-breeds, but he was powerless to prevent the Red River Rebellion, as he was in Rome when it broke out. Taché was made archbishop in 1871, and thereafter devoted a large part of his time to the advancement of education in Manitoba.

Taché, Sir Etienne Pascal (1795-1865), a Canadian statesman who was twice Premier of Canada (Upper and Lower Canada, as the country was known before confederation, when it became the Dominion of Canada.), was born at Saint Thomas, Quebec, and attended school there for a time. When the War of 1812 opened he enlisted in the Canadian militia. After the close of the war he studied medicine and until 1841 was an active practitioner. In that year he was elected to the Canadian legislature, and while in that body he was successively Commissioner of Public Works, deputy adjutant-general of militia, and member of the legislative council; Receiver-General in 1849-51 and again in 1852-56; and in 1856 was chosen speaker of the legislative council.

Also in 1856 Sir Etienne was made Prime Minister of Canada in the first Taché-Macdonald ministry. He resigned the office of Premier in 1857, but formed the second Taché-Macdonald ministry in 1864. Sir Etienne was knighted in 1858. He was an able statesman, but during his two Premierships, Macdonald was the real head of the government.

Tacitus, tăs′ĭ-tus (about 54-117 A. D.), a Roman historian and orator. His principal works are his *Agricola, Germania,* and *Annals.* The first is the life of his father-in-law, an eminent Roman general; the second is an account of the German tribes along the Rhine; the third is a history of his own time. His style is marked by brevity and a brilliant choice of words. He does not deal with cause and effect, nor does he attempt to give both sides. He is intensely partisan. In that respect, at least, there is a resemblance between Tacitus and Macaulay who admired the Roman very much. In a use of happily chosen words some have called attention to a similarity between Tacitus' *Annals* and Carlyle's *Frederick the Great.* See LATIN.

Tacoma, the county seat of Pierce County, Washington, and the third city of the state, is on Puget Sound at the head of Commencement Bay and on the Puyallus River, 28 miles south of Seattle. Tacoma is a seaport, and is afforded rail transport by the Chicago, Milwaukee & St. Paul, Great Northern, Northern Pacific and Oregon & Washington Railroad & Navigation Company railroads. The environs of Tacoma are rich in scenic beauty; the city lies between the Cascade and Olympic mountains, and 60 miles to the south is Mount Rainier.

Tacoma has extensive commercial and manufacturing interests; it has connections with ports on the Pacific Coast, in the Orient and in Europe, and from its manufactories issue furniture, cereal foods, flour, foundry and machine shop products, finished lumber, dressed meats and many other articles. Here is located a large smelter and the car shops of the Northern Pacific railroad.

The city has a system of modern public primary and high schools, and the Annie Wright Seminary, Pacific Lutheran University, Whitworth College, University of Puget Sound, a Carnegie library and a school for Indians.

Attractive features are the 1,200 acre park system, including Point Defiance, McKinley and Wright parks; the city, county and Federal buildings and the Chamber of Commerce building; Tacoma General, Northern Pacific, County and St. Joseph's hospitals; custom house, State Historical Society and Ferry Museum of Art; and a number of modern office buildings.

The present Tacoma originated in the consolidation, in 1883, of two comparatively young towns—Old Tacoma, settled in 1868, and New Tacoma, founded in 1874. The city is growing steadily; in 1900 there were 37,714 inhabitants; in 1910, 83,743; in 1920, 96,965.

Tadpole. See FROG.

Taffeta, a thin lustrous silk of plain texture. The distinguishing feature of grosgrain silk is the rib; of surah, the twill; and of taffeta, the plain weave. The name taffeta is of uncertain origin. It is thought to be derived from a Persian word, which, however, has two meanings; to spin, and to shine, burn, or glow. The word, as applied to a silken fabric, has been in use since the fourteenth century, and has, during that time, designated a variety of quite different silken textiles. At the present time, the name has reference technically to the plain weave, and may be employed for any material. It is therefore common to use it with some qualifying word as taffeta silk, wool taffeta, etc. Taffeta silks are made in a variety of weights, degrees of fineness, and colorings; in plaids, stripes, and moiré effects. They are largely used for waists, dresses, petticoats, linings, and trimmings.

Taft, Lorado (1860-), a distinguished American sculptor, was born in Elmwood, Illinois, and graduated from the University of Illinois in 1879. He studied at the School of Fine Arts, Paris, later returning to Chicago, where he opened a studio. He has been an instructor at the Chicago Art Institute since 1886, and since 1909 has lectured on art at the University of Chicago.

Mr. Taft's work is characteristic of himself—a blending of the idealistic and the realistic. One of his remarkable creations is a symbolic group: *The Spirit of the Great Lakes,* which is set up on the south façade of the Chicago Art Institute. Another is the exquisite *Solitude of the Soul,* in the Art Institute. Other works are the *Columbus Memorial Fountain,* Washington, D. C.; the *Washington* monument, Seattle; the colossal statue of Blackhawk at Oregon, Ill., and the *Fountain of Time,* designed for Chicago's Midway Plaisance.

Mr. Taft has for many years given popular lectures on art on Sunday afternoons at the Chicago Art Institute, where his profound knowledge of his subject, added to his charm of manner, have held his audiences spellbound.

Taft, William Howard, the twenty-seventh president of the United States. He was born in Cincinnati, Ohio, September 15, 1857. He was graduated at Yale in 1878 and studied law in Cincinnati College. A short term of practice was followed by a course of officeholding. He was county attorney, 1881; collector of revenue, 1883; judge of the superior court, 1887; United States solicitor general, 1890; United States circuit judge, 1892; chairman of a commission to organize civil government in the Philippines, 1900; civil governor of the Philippines, 1901; secretary of war in Roosevelt's cabinet, 1904. In 1908 Mr. Taft was nominated by the Republicans for the presidency. He was elected over William J. Bryan, his Democratic competitor, by a popular vote of 7,637,676, a plurality of 1,233,494. Taft had 321 electoral votes to 162 for Bryan.

As President Taft was the political heir of Roosevelt, his administration has followed quite closely the lines laid down by his predecessor. Nevertheless there have been a number of important bills passed which are distinctly Taft measures. The first of these was the Corporation Tax passed in July, 1909. This was wholly a presidential measure offered by Mr. Taft to effect a compromise between those in Congress who were working for an income tax and for an inheritance tax. It provides for

a one per cent tax upon the net earnings or incomes of all joint-stock companies. Its opponents criticise it on the ground that it penalizes joint-stock concerns, while companies doing as much or an even greater amount of business in their own name, are exempt. The Railroad Bill of 1910 was also a Taft measure. By it the powers of the Interstate Commerce Commission were strengthened. It requires the various common carriers to keep an agent in Washington on whom the Commission may serve papers. It also empowers the Commission to suspend any rate increase for a period of ten months in order to have ample time for investigation. Another important feature of the bill was the right granted the Commission to proceed against any common carrier on its own initiative instead of waiting for complaint to be brought. As used here the term "common carrier" includes not only railroads, but also bridges, ferries, telegraph and telephone systems, including wireless, and cables.

The measure attracting the greatest attention in his administration, however, was the Reciprocity agreement with Canada, to ratify which President Taft convened an extra session of Congress in 1911. With almost the solid support of the Democrats then in control of the House, and with a combination of Democrats and most of the Republicans in the Senate, the bill passed. By it, if accepted by Canada, the duty on a number of imports from Canada, including particularly agricultural products, would have been reduced or abolished. But at a popular election held September 22, 1911, Canada rejected the agreement by a large majority. Besides legislation, a number of other things have signalized his administration. He has enforced the Sherman Anti-Trust law. Smuggling, especially at the New York custom house, has been greatly diminished by the determined action of Collector Loeb. At Mr. Taft's request a permanent Tariff Board was created in 1909 with a view to scientific investigation and reform of the tariff; Professor Emery of Yale was placed at the head of this board, and an appropriation made of $250,000 for carrying on its work. A Commission has been appointed to regulate the sale of stocks and bonds, and a Bureau of Mines has been created to save life and protect the public welfare.

One of the greatest steps in the world's history toward the establishment of universal peace was taken in August, 1911, when the United States signed arbitration treaties with France and England binding themselves to submit all differences arising between them, of whatsoever nature, to arbitration. Hitherto questions involving national honor or vital interests have always been excepted. Although Great Britain took the initiative, President Taft may justly be credited with the impetus which led to the consummation of these treaties.

Though entering office with a united party behind him and a large popular majority, President Taft seemed gradually to lose the confidence of the people. The breach between the "insurgent" and the "stand-pat" elements of the party widened, and the president, whether unjustly or not, was looked upon as one of the latter. Then in the various state and congressional elections of 1910, the democratic party was generally victorious and secured a working majority in the lower house of congress. It passed a number of bills designed to reduce the tariff, which also went through the Republican senate. The veto of these by Mr. Taft did not increase his popularity with the masses.

The split in the Republican party in 1912, resulted in the election of Woodrow Wilson, the Democratic candidate. At the close of his term, Taft became Kent professor of law in Yale University, but he did not lose his interest in public questions. In 1916 he was made chairman of the executive committee of the Red Cross and also elected president of the League to Enforce Peace. June 30, 1921. He was appointed Chief Justice of the United States Supreme Court, to succeed the late Chief Justice White.

Tagore, Sir Rabindranath (1860-), an Indian poet, philosopher and religious teacher, who won the Nobel prize for literature in 1913. He was born at Calcutta, India, was educated privately for a time, and at the age of seventeen was sent to England to study. His formal schooling was supplemented by extensive travel in

Europe. In 1879 he published *Songs of Sunrise* and *Songs of Sunset,* in which he displayed remarkable poetic power. In 1884, Sir Rabindranath was married and went to Shilaidi, on the Ganges, to manage his father's estate. Here he came into intimate contact with the plain people of India, and wrote tales, poems, dramas and parables dealing with their everyday affairs.

Long before he became generally known to the western world, Sir Rabindranath was the "prophet of Bengal" — a kindly, gifted religious teacher, and a zealous Indian nationalist. In his work is found but few marks of western influence; he is the interpreter of the East. Whenever his inmost thoughts are given expression, in no matter what form, the essentials of his spirit come out. He is moved by beauty, no matter what its form; a loving mother, a cloud, a beautiful animal, a flower—all are powerful to move him to poetic utterance. In 1915 he received the honor of knighthood. He acquired facility in the use of English and has translated a number of his own works. Among these are *The Crescent Moon, Mashi, and Other Stories, Chitra, The Cycle of Spring, Nationalism, Stray Birds, King of the Dark Chamber, Sadhana: The Realization of Life* and *The Gardener.* He visited America in 1916 to lecture on internationalism.

Tagus, the longest river in the Spanish peninsula. It rises in the San Juan Mountains and flows west into the Bay of Lisbon, forming part of the boundary between Spain and Portugal. The total length is 500 miles. The lower part of the course is navigable. The chief Spanish city on the banks of the Tagus is Toledo.

Tahiti, tä-hē′tē, the chief of the Society Islands. It is situated in the eastern Pacific and, with the group, belongs to France. Area, 600 square miles. Population, about 12,000. The inhabitants are Polynesians of the Malay race. Tahiti was visited by Captain Cook in 1769, and was early the seat of an English mission. The island is mountainous. Cocoanuts and bananas, oranges, sugar-cane, and vanilla, as well as a little cotton, coffee, and tobacco are cultivated along the coast. The total exports are valued at about $1,000,000 a year. Trade is carried on chiefly with New Zealand or with San Francisco by means of steamships visiting the islands at intervals of about five weeks. Pearls are exported.

Tahoe, tä-hō′, a lake on the border line between Nevada and California. It is twenty miles long and about half as wide. The Truckee River is its outlet. The water has been dammed and diverted to irrigate a large body of land. Lake Tahoe is a picturesque body of water much frequented by tourists. The air and scenery are thus described by Mark Twain:

> We plodded on and at last the lake burst upon us—a noble sheet of blue water lifted six thousand three hundred feet above the level of the sea, and walled in by a rim of snow-clad mountain peaks that towered aloft full three thousand feet higher still! It was a vast oval, and one would have to use up eighty or a hundred good miles in traveling around it. As it lay there with the shadows of the mountains brilliantly photographed upon its still surface, I thought it must surely be the fairest picture the whole earth affords.
>
> Three months of camp life on Lake Tahoe would restore an Egyptian mummy to his pristine vigor, and give him an appetite like an alligator. I do not mean the oldest and driest mummies, of course, but the fresher ones. The air up there in the clouds is very pure and fine, bracing and delicious. And why shouldn't it be?—it is the same the angels breathe. I think that hardly any amount of fatigue can be gathered together that a man can not sleep off in one night on the sand by its side. Not under a roof, but under the sky; it seldom or never rains there in summer time.

Tailor Bird, a warbler of the East Indies noted for the construction of its nest. There are several species. The tailor bird sews together the edges of two green, growing leaves, using the beak for a needle and vegetable fibers for thread. Sometimes a dead leaf is sewed to a green one. Sometimes the edges of a single large leaf are brought together. In this way a swinging pouch is formed in which the bird builds a comfortable nest of lint or other soft material. The leaves continue to grow and form a perfect screen. The birds themselves are in no way noticeable. They are small birds that wear modest plumage and live chiefly on insects.

Taine, tān, **Hippolyte Adolphe** (1828-1893), a distinguished French historian and critic. He was educated in Paris and held various educational positions both in the provinces and in Paris, including a chair in

the Paris School of Fine Arts. He was granted an honorary Doctorate of Laws by Oxford in 1871. He was also a member of the French Academy. The list of his writings is a long one. His best known are his *English Literature* and a *History of Contemporary France.* In his discussion of the French he scores Royalists and Republicans alike. Taine was especially severe in his treatment of Napoleon.

His *History of English Literature* has been translated into many languages, including our own. It is the most celebrated work of the kind yet written. Taine takes the ground that the native temperament of a nation, the physical features or environment of the country, the age in which the writers flourish, and the duration of a period of literature determine in a measure the kind of writings produced, just as certain chemicals placed together in a test tube produce a given result on combination. Race, epoch, substance are, according to Taine, the primary springs from which a literature bursts forth. To his notion, then, the plays of Shakespeare could have been produced at no other time, in no other country, and by no other people; on the other hand, it was but natural that the English people, living in the sort of a country they did, should at this particular period of time produce a series of dramatic works through Shakespeare or some other natural genius.

Taine's history is a piece of brilliant writing. His themes have attracted universal attention. The weakness of his argument lies in the fact, however, that it is seemingly easy to account for literary production after it has appeared, but that the closest study of factors fails to reveal the time or place when more masterpieces are to be expected. Even the most devoted disciple of Taine cannot forecast the literature of the next decade, let alone the incoming century.

Taine is a writer whose work always produces a disagreeable impression upon me, as though of a creaking of pulleys and a clicking of machinery. There is a smell of the laboratory about it. The book is instructive in the highest degree, but instead of animating and stirring, it parches, corrodes, and saddens the reader.—Amiel.

Taj Mahal, täzh ma-häl′, a celebrated mausoleum. It was built in the early part of the seventeenth century by the Mogul emperor, Shah Jehan, for himself and his favorite wife. It stands in the midst of a beautiful garden, an orderly wilderness of vegetation half a mile square, outside the city walls of Agra, India. The richness of the green foliage partly conceals and yet heightens the beauty of the mausoleum. The structure proper stands on a platform of white marble 313 feet square and 18 feet high. A tapering cylindrical minaret 133 feet high ornaments each corner of the platform. The mausoleum itself is 186 feet square. The corners are cut off, giving the building a somewhat octagonal form. The outside walls contain two tiers of arches shaped like the keel of a boat. There are four great portals, one at the middle of each side. The center of the structure is crowned by a pointed, bulbous dome, fifty-eight feet in diameter, surrounded by four eight-sided kiosks. The tip of the central dome is about 210 feet above the pavement.

The interior comprises four domed chambers, one in each corner; also a large octagonal chamber in the center, surrounded by an arcade. The five chambers are connected by corridors. Light enters the building through marble screens. The emperor and the empress rest in the central chamber. The immediate spot is surrounded by an octagonal screen of remarkable lace-like openwork in alabaster. The entire interior is decorated richly. Many passages from the Koran are written on the walls in precious stones. An immense amount of lapis lazuli is used. Flowers and arabesques in mosaic are composed of jasper, bloodstone, jade, onyx, and agate. All in all, the building is considered the most exquisite in existence. It is called the "gem of buildings, — a glimpse of Paradise." One writer said it was built by a giant and finished by a jeweler. Kipling, looking at the building from the window of a train, called it "an opal tinted cloud on the horizon." Later, having viewed it closely, he wrote, "Let those who scoff at overmuch enthusiasm look at the Taj Mahal and thenceforward be dumb. Each must view it for himself with his own eyes, working out his own interpretation of the sight." Another writer has said, "Words

are worthless in describing a building which is absolutely faultless."

One curious acoustic property is related by travelers. A harsh word uttered in the interior is echoed harshly and ceases suddenly; but a woman's voice, as of one singing gently, echoes many, many times with wonderful sweetness and dies away like "the notes of a flying wood dove in a forest."

Invading hordes abused the mausoleum, looting it of precious stones. The English redcoats, too, pried off many a piece of mosaic to be sent home to England as a souvenir. Of late, the British government has undertaken the restoration of the building. The diamonds, rubies, and emeralds of old have been replaced by bits of colored glass.

Twenty thousand workmen are said to have been engaged in the building of the Taj, extending through a period of twenty-two years. Even though labor in India be reckoned at a few cents a day, the cost of obtaining material and erecting the building has been estimated variously at from $20,000,000 to $50,000,000.

See ARCHITECTURE; INDIA; MAUSOLEUM.

Talc, a common, non-metallic mineral. It is composed chiefly of magnesia, silica, and water. It is allied to mica. Like mica, it occurs in sheets readily separated into thin plates, and also in masses. Talc has a greasy, soapy feeling. Its color varies from a silvery white to apple green. In Moore's scale of hardness as applied to minerals, a scale of ten, talc is called type one, the diamond at the other extreme, type ten. Talc is cut readily, but it is surprisingly tough. Certain forms of talc are known as steatite or soapstone. A whitish variety is known as French chalk.

There are enormous beds of talc in the United States. The chief sources of supply are North Carolina, Virginia, and St. Lawrence County, New York. The American product for 1921 is estimated by the United States Geological Survey at 222,724 short tons, valued at $3,052,038. Talc has many uses in the arts. It is acid-proof, and withstands a high degree of heat. Flour talc is extensively employed in fireproofing. It is used to absorb nitroglycerin in the manufacture of dynamite. Talc has value also in the manufacture of soaps, in dressing leather, and in making axle grease. It is an ingredient in the manufacture of paper; talc sizing increases the weight, and gives smoothness and additional strength. Soapstone, that is to say talc, griddles may be used without grease. The Chinese and Japanese carve many ornaments, miniature idols, etc., out of talc. Talcum powder is a well known article of the toilet. Steatite, sawed into slate pencils and blackboard crayons of a greenish color, is used in many schools. The tailor's crayon with which he marks his cloth before cutting is made of steatite.

Soapstone is about the only stone that may be heated hot and sprinkled with water or even plunged into water without cracking. The North American Indians were aware of this peculiar quality. The Eskimos made soapstone lamps in which, by means of moss wicks, they burned blubber for light and heat. Soapstone lamps, griddles, kettles, and pans are still found in Indian villages up and down the Pacific coast. The Indian women of southern California were skillful in making a pot called by the Spanish priests an olla. It was a foot or more in diameter and was almost spherical in form. It was scraped smooth inside and out with a piece of flint or bone. The mouth was barely large enough to admit the hand. Utensils made of this potstone material appear to have been the forerunners of the native pottery for which the Indians of the Southwest are noted.

See POTTERY.

Talent, a unit of weight in use among the ancients. Both as a measure of weight and as a measure of value the talent differed at different times and in different localities. The Hebrew talent represented about ninety-four pounds advoirdupois and possibly $1,500 in silver. It was divided into 3,000 shekels. The Attic talent is held by scholars to represent fifty-seven pounds troy weight and $1,220 in silver. It was divided into 6,000 drachmae. The Romans had a great talent and a little talent. The former was worth $500 in silver. The other, a fourth less.

Tale of Two Cities, a novel by Charles Dickens, published in 1859. The scene of

the story is laid partly in London and partly in Paris, at the time just preceding and during the French Revolution. In this novel, contrary to his usual custom, Dickens depends more upon character drawing. The story is intensely dramatic, and also contains many fine descriptive passages. It displays less of humor than any other of Dickens' novels.

Talisman, a consecrated object or charm supposed to have supernatural influence over the bearer, especially in averting disease or sudden death. Under different forms and names the talisman may be traced through ancient and medieval history. The Egyptians carried images of their gods and sacred animals, especially the ibis and the scarabaeus. The Hebrews made broad their phylacteries and inscribed thereon passages from the Old Testament. Even the Greeks carried tablets bearing magic words copied from the inscriptions on the feet, the girdle, and the crown of the statue of Artemis at Ephesus. The Romans carried charms by little chains, no doubt the prototype of the modern necklace. The Arabians and Turks still place confidence in the power of sentences from the Koran to avert misfortune. In the Middle Ages the astrologers engraved heavenly signs and other figures and characters on stone and metal for the use of the superstitious. It was important that the talisman be made at the right astronomical moment, as when the proper star was in the ascendant. Scott weaves the belief into his medieval tale of *The Talisman.*

Tallahassee, tăl′a-hăs-e, the capital of Florida. It is on several railroads, and lying, as it does, in the midst of a prosperous southern agricultural region, it ships considerable cotton, cottonseed oil, tobacco, and fruit. Tallahassee is a favorite winter resort, and contains a number of hotels. Besides the state buildings, a hospital, and three libraries, the State College for Women is located there. The population in 1920 was 5,637.

Talleyrand, tăl′lĭ-rănd (1754-1838), a French statesman and diplomat. He was a native of Paris. His father was a man of rank and an officer in the French army. Young Talleyrand, as well as his family, would have preferred a military career; but, on account of lameness, he was educated for the church. Although a notorious profligate, he rose through family influence from one church position to another to be Bishop of Autun. In the early days of the French Revolution, he was elected a delegate to represent the clerical interests. Perceiving that the notion would be popular, he was foremost in proposing the confiscation of church property by the state. He undertook also to ordain a national clergy. For this he was excommunicated by the pope. The Revolutionary leaders sent him to London on a diplomatic mission, but, finding that he was corresponding with the king's party, an edict was passed banishing him from France. In 1794, the English government refusing to afford him further protection, he spent a year in the United States. In 1796 he returned to Paris.

Talleyrand had the discernment to foresee the rising fortunes of Napoleon and attached himself to that brilliant young officer. He took a leading part in the shaping of events in Napoleon's favor. The latter made him his confidential minister of foreign affairs. Talleyrand showed no little skill in forming coalitions, especially the Confederation of the Rhine, and in carrying out his master's wish to place the members of the Bonaparte family on thrones. Later, whether Talleyrand foresaw Napoleon's downfall or not, he certainly quarreled with him with reference to the invasion of Spain and the famous invasion of Russia which resulted in the disastrous retreat from Moscow. From this time on, he was Napoleon's most active enemy. As plenipotentiary of France he sat with Metternich in the Congress of Vienna which banished Napoleon to Elba. He was active in the restoration of the Bourbons. He was minister of foreign affairs under Louis XVIII, and was ambassador to London from 1830 to 1834. In the reign of Louis Philippe, Talleyrand fell into disrepute and lived unnoticed. He was a friend of the famous Madame de Staël. He left a fortune of $3,500,000 to a niece.

Talleyrand was a brilliant, tactful, unscrupulous, farseeing intriguer. It was his favorite motto in diplomacy that words could be used to conceal intentions. He

is credited with the expression "the beginning of the end." For three decades he was the foremost diplomatic figure in Europe. In private life he was without doubt one of the most notoriously profligate scamps ever connected with the French court.

See METTERNICH.

Tallow. See OIL.

Tallow-Tree, any one of several trees which yield the substance known as vegetable tallow. The common tallow-tree is a native of China. It has been introduced into India and the West Indies and into the southern part of the United States. The seed pods are an inch and a half thick. They contain three seeds each which are coated with a fatty substance from which tallow may be extracted. The Chinese use this tallow for candles. They press an oil from the seeds which makes a serviceable varnish. A black die is extracted from the leaf of the tree. The wood itself is hard and dark-grained and serves many useful purposes.

Tally, a stick once in general use for keeping accounts. Debts were indicated by notches cut clear across the stick. The stick was then split in two, one-half being given to the debtor, the other retained by the creditor. If either debtor or creditor attempted to tamper with his half of the tally, the other half would show that changes had been made. Additional debts were recorded by placing the two halves of the stick together and cutting new notches extending across both. Good sized notches were used to indicate different amounts. A notch for £100 was as wide as one's thumb; for one pound as wide as a barleycorn; a smaller scratch indicated a penny. Tallies of this sort were actually used by the exchequer of England. As late as 1812 the English government issued tallies to those who loaned it money. The name of the loaner was written on each half of the tally. The use of the tally was clear even to those unable to read and write.

Talmage, tăl′māj, **Thomas De Witt** (1832-1902), a noted American clergyman. He was born at Gateville, New Jersey, January 7, 1832. He died at Washington, D. C., April 12, 1902. He was a farmer's boy. He took a course at the University of the City of New York, after which he studied law, but relinquished the practice for the Reformed Presbyterian ministry. His first charge was at Bellville, New Jersey; his next, Syracuse, New York; then, Philadelphia; then he was called to a church of nineteen members in Brooklyn, where he became a pulpit rival of Henry Ward Beecher. His originality and eloquence filled the little church to overflowing. In 1870 his favorite project of building a church capable of seating 3,000 people, was carried into effect. Two years later the building was destroyed by fire, and a large edifice, known as the Brooklyn Tabernacle, took its place. In 1890 Talmage made a trip to the Holy Land. In 1894 he accepted a call to Washington.

Talmage was a sensational preacher of wonderful originality and fervor. He possessed dramatic talent of a high order. His sermons were published widely, and were read eagerly on both sides of the Atlantic. Some scandal arose toward the end by reason of the republication of old discourses as new ones, but the demand could be satisfied in no other way. As a platform lecturer he had few rivals. Many of his sayings are often quoted. To a young minister asking how long a sermon should be, he said, "Fire away as long as you have ammunition." One or two sayings must be given:

Many men are wise for time and foolish for eternity.

Never tell a man what mean things you have heard of him.

London and Pekin are not the great cities of the world. The grave is the great city.

I have noticed that those who sow their wild oats seldom raise any other crop.

A hog can uproot a century plant.

A few trees do not satisfy me. Give me the untamed woods. Shrubs and bushes do not know much and have little to say, but old trees are good company.

Talmud, in Jewish literature, a compilation of traditions, laws, and precepts; also explanations of the Old Testament. According to Kitto, "The Talmud is the work which embodies the civil and canonical law of the Jewish people. It contains those rules and institutions by which, in addition to the Old Testament, the conduct of that nation is regulated. Whatever is obligatory on them, besides the law, is recorded in

this work. Here doubts are resolved, duties explained, cases of conscience cleared up, and the most minute circumstances relative to the conduct of life discussed with wonderful particularity." There are two versions, the Palestinian and the Babylonian. The Hebrew rabbis still instruct their people by reading from the Talmud.

Talon, Jean Baptiste (1625-1691), a French official in Canada, was born in Picardy. He entered the French civil service, and after a period of service in several subordinate capacities he was appointed intendant of justice, police and finance in 1663. His powers extended over Canada, Acadia and other North American possessions of France. Talon was an extremely able man. He built ships, explored for coal and other minerals, began trade with the West Indies. Poor health caused his return to France in 1668, but he was in Canada again in 1670, to remain until 1672. A book written by Talon—*Memorandum to Her Majesty on the Present State of Canada*—is a valuable reference work.

Tamarind, tăm'a-rĭnd, a tree of the pea family, native to the East Indies. It is a noble shade tree, thirty to eighty feet in height, apparently resembling our locust trees. It has long leaves of thirty to forty leaflets, and wreaths of fragrant yellow flowers. The thick pods are three to six inches long and contain a sweet-acid pulp much used in the tropics of both continents in the preparation of delicacies and a cooling drink. Preserves also are made of the pulp. The Tamarind yields a fine, close-grained, yellowish cabinet wood of value.

Tambourine, a musical instrument belonging to the class known as percussion instruments. The tambourine is made by stretching a single sheet of parchment over one end of a broad hoop to which small bells or metal jingles are attached. Thus the instrument resembles one end of a drum. It is played by shaking, by drawing the finger across the parchment, or by striking it with the ends of the fingers, knuckles, elbow, or even knee. "Shaking a tambourine set round with tinkling bells and thumping it on its parchment head," says Hawthorne. The tambourine is supposed to be of oriental origin. It is a favorite instrument with the peasantry of Italy and of Spain. It is played usually as an accompaniment of dancing.

Tamerlane. See TIMUR.

Tammany Society, a political organization in New York City. The society was organized in 1789 about a fortnight after Washington's first inauguration. It has been a political factor ever since. Very possibly it may have been intended as a non-partisan society. The original plan was expressed in the clause: "That the constitution of this society should consist of two parts, the external or public, and the internal or private; the latter shall ever be subordinate to the former." It was intended that a committee should carry out the wishes of the society, but, in practice. the society has carried out the wishes of an internal committee.

The origin of the name is as follows: Tammany was a wise old Delaware chieftain during the Revolutionary War. A sort of Tammany celebration sprang up. The object was simple festivity. A wigwam was erected, a pole was crowned with a liberty cap, a tomahawk, wampum, and other Indian articles were planted in the earth. A comrade, dressed up to represent the great Tammany, made his fellow soldiers a talk full of exhortation in favor of liberty and military courage; after which the soldiers danced around the post with feathers in their caps and bucks' tails hanging down behind. The celebration was not confined to the army. Throughout the central colonies, it took on a form somewhat like our Fourth of July picnics.

The organization of Tammany Society is credited to Aaron Burr, who desired to build up a machine against Alexander Hamilton. The society was to be governed by a grand sachem and thirteen sachems, designed to typify the president and the thirteen original colonies. William Mooney, an upholsterer, an Irish-American, was the first grand sachem. Tammany has a reputation of governing New York corruptly by a double method of levying on the public purse and by pleasing the lower classes of society. Tammany Hall was built in 1868. See TWEED.

Tampa, Fla., a port of entry and the county seat of Hillsboro County, is also a

popular winter resort. It is on Tampa Bay and on the Seaboard Air Line, Tampa Northern, Atlantic Coast Line and Tampa & Gulf Coast railroads, 212 miles south by west of Jacksonville. Steamers connect with Atlantic and Gulf ports, Key West and the West Indies. The harbor is the finest on Florida's western coast.

Cigar making is the leading industry, a large part of the world's supply of "Havanas" issuing from the factories of Tampa. There are also manufactories of wagons, fertilizer, jewelry, furniture, lamps, bricks and tile, automobile tops, mattresses and other articles. The principal exports are fish, wheat, flour, rosin, turpentine, phosphate, lumber, fruit, vegetables and cattle.

One of the most conspicuous buildings is the Tampa Bay Hotel, erected for the accommodation of those who seek escape from the rigours of northern winters. Other attractions are the Federal building, custom house, Ballast Point Park, Sulphur Springs, De Soto Park and the city and county buildings. Besides the public schools there is Jesuit College, Holy Name Academy and a Carnegie library.

Tampa had its beginning in an army post established here in 1850. Later it developed into a ship building center; in 1886 the first railroad reached the settlement and a short time afterward the cigar making industry was begun. After it was constituted a port of entry Tampa grew rapidly. It is now the second city of Florida, with a population of 51,608 in 1920.

Tampico, the oil capital of Mexico, is situated on the Punaco River, 6 miles from the Gulf of Mexico, and 206 miles northeast of the City of Mexico. It is the chief city of the state of Tamaulipas. Two railroads connect the city with the interior states of northern Mexico, for which it is the chief outlet, and boats ply the Panuco from the city to the mouth of the Tamazunchale, a distance of about 135 miles. Modern harbor facilities make Tampico accessible to large boats. The district surrounding the city is swampy and pestilential, but a modern sewer system has improved sanitary conditions, preventing a recurrence of the yellow fever epidemic such as the one suffered in 1903. Tampico is built on the site of an ancient Aztec city. Though it is now a prosperous semi-American city, it was rebuilt as lately as 1823, after destruction by the bandit Lorencillo in 1683. During the World War the Tampico fields supplied almost all of the oil burned by the ships of the British navy; and it was due to the necessity of closely guarding this supply that in 1917 President Wilson lifted the embargo on the shipment of arms and ammunition into Mexico. It was in Tampico that the American flag was insulted in 1914, almost causing war between the United States and Mexico. While the oil industry is now of first importance in Tampico, the city also exports silver boullion, copper ore, rubber, asphalt, sarsaparilla, sugar, hides and cattle. In 1919 it had a population of 60,000.

Tanager, tăn'a-jĕr, an American family of birds. Of 350 species, nearly all are brightly colored inhabitants of tropical forests. Of the five species found in the United States the scarlet tanager, about seven inches in length, is chief. The plumage of the male is a bright scarlet with black wings and tail. The female is olive green above and greenish yellow beneath. The tanager ranges in deep, green woods from Manitoba to Virginia and eastward. It passes the winter beyond the Gulf of Mexico. The nest is placed near the end of a branch ten to twenty feet from the ground. The male especially is fond of a lofty swinging perch screened by leaves. He seems to realize that his plumage is conspicuous. One no sooner locates his bird and focuses his fieldglass on it, than the tanager apprehends danger and is gone into the depths of the forest. Its food is chiefly fruit and insects. It is the most brilliant bird in our forests. The summer tanager with rose red plumage ranges from Florida to New Jersey. The Louisiana tanager is a Western bird.

Tancred, the hero of the First Crusade. He was the son of Otto the Good and Emma. He distinguished himself by deeds of valor at the taking of Nice and Antioch, and was first on the walls of Jerusalem. Later he was made prince of Galilee. He is the hero of Tasso's celebrated poem, *Jerusalem Delivered.* Tancred was valiant in

battle and merciful in victory. He died at Antioch in 1112. See TASSO; CRUSADES.

Taney, taw′nĭ, **Roger Brooke** (1777-1864), an American jurist. He was a native of Maryland, a descendant of a prominent Catholic family. He married Anne Key, a Protestant, the sister of Francis Scott Key, the author of *The Star-Spangled Banner.* He was graduated from Dickinson College in 1795, and opened a law office in Annapolis in 1799. From the first he took an interest in federal politics. He served repeatedly in the state legislature and acquired a large practice before the United States supreme court. As an ardent Democrat he became attorney-general for Maryland. In 1831 President Jackson appointed him to a corresponding position in his cabinet, and later, pleased with his hostility to the United States Bank, made him secretary of the treasury. In this capacity, Taney removed the government's deposits from that institution, but was obliged to retire from office, as the Senate refused to confirm "Jackson's tool." This was the first instance in which the Senate refused to permit a president to choose his own cabinet. Jackson then nominated Taney for associate justice of the supreme court, but he was rejected by the Senate. In 1836, in spite of the stormy opposition of Henry Clay and other Whigs, Taney was nominated again and was confirmed as chief justice to succeed the eminent John Marshall of Virginia.

Taney is credited with having established systematic methods lacking under Marshall. Taney's reputation in United States history, however, is connected largely with the celebrated Dred Scott Decision, in which he enunciated the principle that a slave, being property, could not be a citizen, and that the Missouri Compromise and other acts of Congress limiting slavery were unconstitutional in that they aimed to interfere with property without compensation to the owner; that is, to free a man's slaves within certain territory without paying him for them. As a matter of law, the decision legalized slavery throughout the United States, a predicament from which the country was rescued by the Civil War.

There is every reason to believe that public opinion has been too harsh in passing judgment on Justice Taney. He was a man of unflagging industry, of system, and of integrity. As early as 1819, while trying a case in defense of a Methodist clergyman charged with inciting slaves to turn on their masters, he said, "A hard necessity compels us to endure the evil of slavery for a time: yet while it continues it is a blot on our national character." On another occasion, he spoke of slavery as a reflection on our nation and expressed the confident hope that it would be wiped away effectually. "Until it shall be accomplished, until the time shall come when we can point without a blush to the language held in the Declaration of Independence," he said, "every friend of humanity will seek to lighten the galling chain of slavery and better to the utmost of his power the wretched condition of the slave." In addition he set his own slaves free and started them in the world. Very probably history may decide that the decision, however, regrettable, was the only one possible under a strict construction of the Constitution which he had taken oath to protect and obey. In the meantime, he is regarded as one who, in a critical hour, made a decision contrary to the spirit of the age, contrary to the best hopes and aspirations of the nation at large.

See DRED SCOTT DECISION; MISSOURI COMPROMISE.

Tanganyika, tän-gän-yē′kä, one of the great lakes of central Africa. It forms a meeting point of Rhodesia, former German East Africa, and the Congo Free State. It is about 400 miles long and from 10 to 60 miles wide. It lies in the great African rift valley, hence it takes a north and south direction. The eastern shore is hilly; the western is mountainous. The waters escape westward through a cleft and reach the Congo. The lake is deep and is slightly brackish near the shores. The fisheries are of value. It is one of the last resorts of the crocodile and the hippopotamus. The lake was discovered by Speke and Burton in 1858. Its shores were visited by Livingstone and by Stanley. Steamers of several nations ply on the lake. Ujiji is the chief port. A well worn trail leads to the coast of Zanzibar.

Tanganyika Territory (formerly Ger-

man East Africa), is a British mandatory lying between the Indian Ocean, east, and Lake Tanganyika, west, and Victoria Nyassa and Kenya Colony, north, and Portugese East Africa, south. The German colony had an area of 385,000 square miles; but since a part of it was ceded to Belgium and another part to Portugal, the area of Tanganyika is now 365,000 square miles. The inhabitants number about 4,500,000, of whom some 2,500 are Europeans. Dar-es-Salaam, the largest town on the coast, has a population of 20,000, but the inland town of Tabora has 25,000 inhabitants.

Tanganyika is as yet wholly undeveloped, but the possibilities of the territory are immense. The forests are rich in valuable timber, minerals are present, domestic animals thrive and the soil is prolific. At present the chief crops are sisal, cotton, coffee and cocoanuts. These, together with hides, are the leading exports. Rice and other foodstuffs, and cotton goods, are the chief imports.

Tanganyika was made a British mandatory after the close of the World War, and is administered by a governor and a few assistants.

Tangiers. See MOROCCO.

Tanis, a city that was situated in the northeast corner of the Nile Delta, in ancient Egypt. Tanis was the capital of the fourteenth nome of Lower Egypt, and it housed a wonderful temple, to which thousands daily went to worship. The city was also a great fortification at the time of the wars against Syria and Palestine. In the Twenty-first Dynasty, Tanis became capital of the whole of Egypt, and exercised great influence.

Tannhäuser, tän'hoi-zer, a German lyric poet of the thirteenth century. Like other singers of the day, he led a wandering life, visiting the Bavarian and Austrian courts. He also traveled in the far East. He was a minnesinger and a writer of dance songs. His name has been preserved in ballads of the sixteenth century. There is also a legend of a knight of the name. The chief event in the tradition of his life is a visit of penance to Rome, seeking absolution for a life of levity at the court of Venus in the mountains. Pope Urban, who held a dry staff in his hand, said to Tannhäuser: "Guilt such as thine can never be remitted; sooner shall the dry staff in my hand grow green and blossom than that God should pardon thee!" Tannhäuser departed in despair. On the third day afterward the pope's staff began to bud and sent forth green shoots. The pope sent out in search of the knight but without avail. He had gone back to the lady Venus in the mountains and was heard from no more. No doubt the devil got him. Richard Wagner made this tradition the subject of his celebrated opera of Tannhäuser. See WAGNER.

Tannin, a substance much used by the tanner in the manufacture of leather. There are several tannins, all of vegetable origin. Scientists divided them into two groups. Tannins of the first class are obtained from abnormal growths caused usually by the sting of insects. The most important source of this sort is nut galls. Other tannins are obtained from healthy portions of the plants, as from the leaves and twigs of the sumac and from the bark and leaves of various oaks and the hemlock. Other tannins are obtained from divi-divi and catechu. It is the particular province of tannin to prevent bacteria from rotting the leather. For this reason the hides are steeped after proper preparation in an extract of tannin. See GALL.

Tanning. See LEATHER.

Tansy, tăn-zy, a coarse wayside plant of the composite family. It has a flat top of small yellow heads like those of a goldenrod, and dark-green cut leaves reminding one of certain ferns. It came over with the white people from Europe. Tansy thrives along road sides and in waste places, where it disputes the right of possession with dogfennel. The leaves contain a bitter aromatic oil. Tansy was once used as a flavoring and persistently as a household remedy for various disorders of the stomach and for muscular rheumatism. It has fallen into disfavor for culinary purposes, but it still holds a place as a remedy. The oil is a narcotic. Taken in sufficient quantity it is an active poison. See MEDICINE.

Tantalus, tăn'ta-lŭs, in Greek legend, the son of Zeus or Pluto. According to one account he stole the nectar and ambrosia of the gods. He was a confirmed gossip. Fo:

revealing the secrets of the gods he was condemned to eternal thirst and hunger. Aeneas saw him in the lower world. He stood in a pool, his chin level with the water; yet whenever he stooped his hoary head to drink, the water fled away and left his lips and throat parched with thirst. The boughs of fruit trees laden with luscious fruits, pears, pomegranates, apples, and figs bent over his head; yet whenever he put forth his hand to seize the fruit, the wind tossed the branches out of his reach. Our word to tantalize is derived from the name.

Taoism, tä-ō-ĭzm, the religion of a certain sect in China. The word is from a Chinese word *tao,* meaning reason. Many deities are worshipped, including a number of genii. The greatest of the gods is the Exalted Monarch; the greatest of the genii, the God of Long Life. The high priest is called Master of Heaven, and is supposed to be an incarnation of the Exalted Monarch. Buddhism has had considerable influence among the lower orders of people where Taoism prevails. Among many other Buddhist ideas that of the transmigration of souls is believed firmly.

Tapestry, a hand-wrought textile of ancient origin produced by working into a system of warp threads numberless short threads which form both the filling and design. Tapestry is not woven in the ordinary sense of the word, since no shuttle is used, and no weft threads of regular length. It is not embroidery, for that is produced by the needle, and on textiles previously woven. The famous Bayeux tapestry, so called since the designs are similar and the historical value equal to that of real tapestries, is technically a piece of embroidery done in needlework on linen canvas. Certain makes of carpets are called tapestry; and many cotton, wool, and silk textiles, imitating in design the real tapestries, are called by that name.

Many tapestries are in existence from various periods of the world's history. There are fragments antedating the Christian era up to the productions of recent years. The fourteenth and fifteenth centuries are the periods when this art was probably at its height, the tapestry worker at that time ranking with the painter and sculptor. Each separate piece of this medieval tapestry is an original production. The model was interpreted, but not copied, by the tapestry worker. The designs are varied and elaborate. They depict scenes in which human figures bear a prominent part. Bible stories, mythological scenes, the legends of saints, above all, scenes from actual history, expeditions, battles, coronations, weddings, victories of kings and princes, are cunningly wrought out in these wonderful hangings. Other varieties called *verdures* represent trees and groves. These are especially beautiful as wall decorations.

The oldest of all existing tapestries were discovered in the Crimea by Stephani, the archaeologist. They are believed to have been woven in Asia 400 years before the Christian era. Among ancient nations Egypt was noted especially for its tapestries. Egyptian tapestries from the second century A. D. have been found in tombs. These early tapestries were woven in the form of bands, used as decorations for the robes of royalty. They were used also to some extent for household decoration. From Egypt to Asia, from Asia to Greece and Rome, thence to France and other parts of Europe, the art of tapestry weaving advanced. During the Middle Ages tapestry came into use as wall hangings. The oldest of these mural tapestries in existence are fragments from the Church of Saint Gereon in Cologne. These date from the eleventh and twelfth centuries. From the eighth to the fifteenth centuries we find records of nuns and monks, queens and court ladies, devoting time to this work. Palaces and temples, altars and the walls of churches, were adorned with it. The city of Arras, France, became so famous for its tapestry that the names Arras, Arras work, or cloth of Arras have ever since been used properly to designate tapestries. Designs for these medieval tapestries were made by many celebrated artists, even Raphael and Titian furnishing paintings to serve as patterns.

Tapeworm, a parasitic flat-worm. The common tapeworms live in the intestines of man. One end is attached to the wall, the other hangs free. The tapeworm has no mouth, no alimentary canal. It lives by absorbing the digested food of its host. It has no eyes, no special sense of any kind.

It attains an extreme length of several yards. The body consists of some several hundred segments, according to age and favorable conditions. There are several species. The larvae of the species, known as the beef tapeworm, the pork tapeworm, and the broad tapeworm, are derived from beef, pork, and the flesh of fishes respectively. The head, or the part by which the animal attaches itself by means of hooks to the wall of the human intestine, is really the whole animal. The segments are merely successive egg cases, the oldest being farthest from the head. A chain of them may break off at any time, leaving the worm uninjured. It is necessary to detach the head before the tapeworm can be expelled from the body. In fact, the breaking away of segments is nature's plan. The egg sacs must be expelled and be eaten with the food by some other animal, as an ox, hog, or fish, in the intestine of which the larvae develop before they are ready to enter man. Two entirely different animals are requisite, therefore, as homes for the tapeworm. See PARASITE.

Tapioca, a preparation from the root of the cassava or manioc plant. There are two cassava plants, the bitter and the sweet. Both are natives of South America. The former is the more valuable and has been introduced into most tropical regions. It has a cluster of carrot-shaped root-stocks which attain a length of thirty-five inches and a weight of thirty pounds. The roots are poisonous when green, but after they have been washed, sliced, and dried, they lose their poisonous qualities. The dry root-stock is grated and the starch is washed out in the usual way. It is then called Brazilian arrowroot. When the starch is heated on hot plates and stirred with a rod, the grains burst and collect into small irregular masses. This is the tapioca of commerce, sold in groceries. It is used for puddings, and, in general, as a substitute for rice. Our chief supply comes from the West Indies and Brazil. Large quantities are exported by the East Indies. The cassava plant belongs to the spurge family. Tapioca is one of the purest starches known. See STARCH, SAGO.

Tapir, tā′pēr, a tropical animal between the hog and the rhinoceros. The body is clumsy and is covered with scanty, black hair. The legs are thick and stout, with four small hoofs on the forefoot and three on the hind foot. The snout, which is flexible, is prolonged a few inches beyond the mouth, and is quite suggestive of an elephant's trunk. The common tapir of Brazil is about five feet long and three feet high. It lives in swampy places and feeds on vegetables, fruits, and herbs. It swims and dives at pleasure. Its chief enemy is the anaconda. Its skin is valuable for leather, and its flesh is used for food. A smaller species inhabits the wooded slopes of the Andes. A third species, the largest of all, ranges in the forests of Sumatra and adjacent islands of Malaysia. See PECCARY; HOG.

Tar, a dark, sticky liquid variously obtained by destructive distillation. The wood tar of the United States is produced chiefly in the southern Atlantic States from the long-leafed pine by a very crude method. A conical chamber or cave is excavated in the side of a steep bank. A large sheet-iron pan is placed in the bottom, provided with a spout leading into a barrel outside. The cave is filled with logs of pine, and the face built up with sods to prevent the entrance of air. The mass of wood is then fired. It burns slowly without a flame, and literally roasts the tar out of the wood. The tar is caught in the pan, and trickles slowly out into the barrel. When one barrel is filled, another is put in its place. Wood tar is in use for tarring ropes, and covering timbers exposed to the weather. Tar is a cure for certain diseases of the skin. It is used in making tar soap and in compounding tar remedies for lung troubles. Charleston, South Carolina, Archangel, Russia, and Stockholm, Sweden, are noted centers of the tar trade. Coal tar is obtained—ten gallons to the ton—by a somewhat similar process of roasting coal in the manufacture of illuminating gas. It is used for preserving timber and in making tar paper. Coal tar also makes an excellent protective paint and, being waterproof, is much used in laying gravel roofs. Coal tar yields the oil known as benzine. It is the base also of the beautiful aniline colors now the dependence of the dyer's art. Owners of gasworks formerly considered coal

tar an expensive nuisance. They now regard it as a by-product of substantial value. See TURPENTINE; ANILINE.

Tarantula, a large, running spider. The name is from Taranto, Italy. Several species, both Old World and New, are included and are popularly supposed to be venomous. They are spiders that chase their prey instead of weaving webs. They build tubular houses in the earth, fortified with a trap door or a turret. The tarantula of Texas is a huge, hairy fellow, whose legs extend two or three inches from tip to tip. It is a pleasure to know that a wasp more powerful than he stings him and hides him away for its young to feast on. A tarantula is frequently found in bananas and creates no little interest in Northern groceries. A mounted tarantula is a favorite curio with the tourists of the Southwest. One Pasadena dealer employs boys to collect specimens. He sells 8,000 tarantulas a year. See SPIDER.

Tarbell, Ida Minerva (1857-), an American historian and writer, noted more recently for her *History of the Standard Oil Company.* Miss Tarbell was born in Titusville, Pennsylvania. She graduated with honors from Allegheny College, for eight years was associate editor of *The Chautauquan,* and then studied for three years in Paris, at the Sorbonne, the College of France. Her earlier books were a *Life of Napoleon, Life of Madame Roland,* and in 1900 a *Life of Lincoln* which has had an immense sale. From 1894 to 1906 she was associate editor of *McClure's,* in which magazine the great history of the oil trust was published. Miss Tarbell's father, like thousands of other men, had lost everything through the grasping methods of Standard Oil, but her story of the great corporation is quite free from personal malice. No book could be written with more fairness and truth. Miss Tarbell's great dread is of making an untrue statement, and she takes great pains to guard against doing so. She has written many magazine articles on public questions, particularly the trusts. One magazine sketch calls her "the woman who has made people comprehend the meaning of the trusts." Since 1906 Miss Tarbell has been editor of *The American Magazine.* The following quotation illustrates her attitude toward dishonesty in business: "As for the ethical side, there is no cure but in an increasing scorn of unfair play—an increasing sense that a thing won by breaking the rules of the game is not worth the winning. When the business man who fights to secure special privileges, to crowd his competitor off the track by other than fair competitive methods, receives the same summary, disdainful ostracism by his fellows that the doctor or lawyer who is 'unprofessional,' the athlete who abuses the rules, receive, we shall have gone a long way toward making commerce a fit pursuit for our young men."

Tare, in commerce a deduction made from the gross weight of goods as an allowance for the weight of the bag, box, cask, or other package. Farmers marketing wheat in sacks are accustomed to allowing a pound of tare for each sack. In the old arithmetics tare is associated with tret. Tret, now entirely discontinued, was an allowance of four pounds to the hundred to customers who were obliged to transport their wares to great distances. Tret was allowed, no doubt, on the plea that goods would suffer loss in weight or bulk through transportation.

Tariff, tăr′ĭf, in political economy, a tax levied on imports or exports. In the United States and Great Britain the tariff refers only to imports. The term seems to have been derived, through the Italian and Spanish, from an old Arabic word meaning a list, as of prices or of fees to be paid. A port cape on the southern coast of Spain, at which the Spaniards and Moors were accustomed to collect duties from ships desiring to enter the Mediterranean, was called Tarifa. The collecting of tariff at this point gave name to the port.

A tariff levied for the support of the government only is called a tariff for revenue. A tariff levied with a view to increase the cost of foreign goods and thus to assist native manufacturers, is called a protective tariff. A tariff so high that it practically shuts out foreign goods is called a prohibitive tariff.

A prohibitive tariff is seldom used, but reciprocity (which see) is often agreed upon to the mutual advantage of the contracting nations. A free-trade nation is

one that has a tariff for revenue only. England is the most conspicuous example. Before the Great War most of the European nations had a protective tariff. (For arguments for and against protective tariff. See FREE TRADE; PROTECTION.)

UNITED STATES. Previous to the Constitution there was no general tariff policy in the United States. The first tariff law was passed in 1789, primarily to secure revenue for the government, it was also protective to a limited extent. The tariff of 1816 was distinctively protective. It continued in force until the act of 1824 which raised the average duties thirty-seven per cent. The purpose was to exclude from American markets all products competing with domestic manufactures.

The tariff had become a political issue. The loose constructionists, under the leadership of Clay, supported high protective tariff, which they termed the "American System." The strict constructionists advocated a tariff for revenue. The tariff of 1828 placed almost prohibitive duties on cotton and woolen cloth and some other articles. It was called the "tariff of abominations" and was strongly opposed by the South, who exported large quantities of cotton and tobacco to Great Britain and feared that this tariff would cause that country to retaliate. See NULLIFICATION.

In 1832 these duties were slightly modified and in 1833 the law was set aside in favor of a compromise tariff act, providing that all duties should be gradually reduced until 1842, when they should not exceed twenty per cent. But in 1842 the Whigs came into power and slightly raised the duties. In 1845 the Democrats again passed the Walker Tariff Act, which was characterized as a free-trade measure.

During the Civil War, the tariff was increased several times, beginning with the Morrill Act of 1861. By 1868 the duties had been raised over fifty per cent. Between that date and 1880 the tariff received little attention. The tariff was an issue in the presidential campaign in 1884. The Mills Bill providing for a lower tariff passed the House in 1888, but was killed in the Senate. The McKinley Bill of 1890 placed the duties higher than ever before. A reduction was made during Cleveland's second term, but the Dingley Bill in 1897 placed the duties at the highest point they had reached.

The rapid development of American industries since 1890 made a readjustment of the tariff necessary, and the Payne-Aldrich Bill was passed during Taft's administration for that purpose. However, it made but few changes. Immediately after his inauguration in 1913, President Wilson called an extra session of Congress to revise the tariff, and the Simmons-Underwood Act passed by that Congress very materially reduced the duties on cotton and woolen goods and placed wool on the free list, as was sugar after 1916. Upon the return of the Republicans to power in 1921 an emergency tariff law in the interest of farmers was enacted.

The present tariff of customs duties in the United States was prescribed by the Fordney-McCumber Tariff Act, which was signed by President Harding, September 21, 1922, and went into effect immediately. The preparation of this tariff occupied the attention of Congress and its committees for twenty months. It was in the hands of the ways and means committee of the House of Representatives from January 6, 1921, when hearings on its various provisions began, until February 16, and passed the House on July 21 of that year. After it had been considered by the Senate committee, it was reported to the Senate on April 11, 1922, with no fewer than 2,082 amendments. In the Senate 2,436 amendments were made before its passage by that body on August 19, 1922, when it was sent to a conference committee of both houses. The conference report was rejected by the House, which sent it back to the committee with instructions to eliminate an embargo on dyestuffs and the duty on potash. On being again submitted with these changes, it was adopted by the House on September 15 and soon afterward by the Senate. Tariff legislation is one of the most complex and disturbing problems with which Congress is called upon to deal. Manufacturers of all kinds of products seek to have their respective industries

"protected" against foreign competition by heavy duties, while the interests of the public in securing lower prices for imported commodities usually suffer in the process.

United States Treasury experts figured that the latest tariff act would yield about $400,000 a year in revenue, one-half of this amount being expected to be received from the following sources: Sugar, $87,000,000; raw wool, $63,000,000; tobacco, $35,000,000; laces and embroideries, $15,000,000. The total amount in the previous year by the Simmons-Underwood act was $308,025,000, while in 1913, the last year of operation of the Payne-Aldrich Tariff Act, the tariff revenue was $318,891,000. As a matter of fact the yield in the fiscal year 1922-23, under the new Fordney-McCumber act, greatly exceeded all expectations, largely owing to the revival in general business in the United States and heavy imports of all commodities, which resulted in turning an anticipated deficit in the national budget into a surplus of approximately $350,000,000, for which the new tariff was largely accountable.

One of the important provisions of the Fordney-McCumber Act conferred on the President of the United States the power to alter rates of duty in his discretion, under the following conditions:

(a) When the President, after careful investigation, finds that the rates of duty under the Tariff Act of 1922 do not in fact equalize the costs of production of any article or articles between the United States and the principal competing foreign country, he shall determine the rates that will so equalize such difference, and 30 days after the proclamation is made the rates of duty proposed by him shall be in effect on the articles named in the proclamation in lieu of the rates of duty specified in the tariff of 1922, whose rates of duty are to be based upon foreign valuation. He cannot increase or decrease any rate of duty more than 50 per centum of the amount thereof as provided in the tariff of 1922.

(b) When the increase or decrease of 50 per centum in the rates of duty based upon foreign valuation does not equalize the difference in the cost of production between the United States and the principal competing foreign country, then the President shall after due investigation ascertain the American selling price of the competing article or articles, and by proclamation may announce new rates of duty that will equalize the costs of production between the United States and the principal competing foreign country on the articles involved in the inquiry. Such rates of duty, when based upon the American selling price of imported articles, shall not decrease the rates of duty in the tariff of 1922 by more than 50 per centum of such rates, and shall in no case increase them.

The rates based upon the American selling price are to be effective 15 days from the date of the proclamation.

(c) Differences in the cost of production at home and abroad shall be ascertained by giving due weight to differences in conditions of production, wages, costs of materials, hours of labor, and other items involved in production; differences in the wholesale selling prices in this country of similar domestic and foreign articles; subsidies or other assistance foreign governments give their producers; and any other advantages or disadvantages in production."

The President, however, can make no proclamation of changes of rates, under the flexible tariff provisions, until after the United States Tariff Commission has investigated the differences of cost of production at home and abroad; and the investigation of the Tariff Commission is required to be very thorough. The President must determine, in fact, that the differences in cost of production really exist, or that unfair practices exist, before he can take action. The Tariff Commission shall hold public hearings at which interested parties may be present and heard, and is authorized to make proper rules and regulations for the holding of such hearings. If, subsequently to any proclamation or a change in rates, the President finds that the differences of costs of production at home and abroad have ceased to exist, he may modify or terminate the rates formerly proclaimed by him.

The President cannot transfer a dutiable article to the free list, or an article on the free list to the dutiable list, or substitute an ad-valorem rate for a specific rate, or a specific rate for an ad-valorem rate.

Another section authorizes the President to investigate unfair methods of competition and unfair acts of importation, and to declare the same unlawful. He is also authorized to put into effect retaliatory provisions of the act in cases of foreign discrimination against articles wholly or in part the product of the United States, and it is made the duty of the Tariff Com-

mission to make continual investigation concerning the welfare of commerce abroad, and to bring to the attention of the President any discrimination.

In order to give effect to the flexible tariff, which is a new departure in American tariff policy, and to the retaliatory provisions of the Tariff Act of 1922, the Tariff Commission is directed to obtain and compile, and have ready for prompt use, the conversion costs, costs of production, import costs, growers', manufacturers', or producers' selling prices at home and in the manufacturing, producing and growing centers of foreign countries, which export to the United States competitive articles. This will afford the President, the Congress, and the country the information necessary for immediate and effective action.

Tarkington, Booth (1869-), an American novelist. He was born in Indiana. He was graduated from Princeton in 1893, and four years later published his first novel, *The Gentleman from Indiana,* which at once won him a reputation. *Monsieur Beaucaire, The Two Vanrevels, Cherry,* the *Penrod* stories, etc. Of these, *Monsieur Beaucaire* is probably the most artistic. If it obtained less popularity at first than did *The Gentleman from Indiana,* its fame will probably be more lasting. Mr. Tarkington is the author of such plays as *The Man From Home, Cameo Kirby, Springtime, Mister Antonio, The Country Cousin* (with Julian Street), *The Gibson Upright* (with Harry Leon Wilson), *Clarence* and *The Intimate Strangers.* Besides the novels named he wrote *The Flirt, The Turmoil, Seventeen, The Magnificent Ambersons, Ramsey Milholland* and *Alice Adams.*

Tarpeia, tär-pē′ya, in Roman legend, the daughter of a governor of the citadel of Rome on the Capitoline Hill. During a siege of the city the Sabine soldiers tempted her to admit them by a gift of what they wore on the left arm. She expected gold collars and bracelets. As the soldiers entered, however, they cast their shields upon the traitress, whom they scorned. She was crushed to death beneath the weight.

Tarpeian Rock, a name given to the Capitoline Hill from Tarpeia, the traitress. Later, the name was restricted to a cliff or steep declivity of the Capitoline over which criminals were hurled to their death. The exact location of the rock is now a matter of mere tradition.

Tarpon, a large marine fish of the salmon family. It resembles the herring in appearance. The back is of royal blue; the sides are of burnished silver. Both for food and sport, it is considered the finest game fish in American waters. It is found in the West Indies and on the Gulf coast. It is taken to best advantage on the sandy beaches of western Florida. Entire clubhouses are devoted to tarpon fishing. Club records are kept of the date, size, and tackle employed. When the waters are right, it appears on the coast. The tourist and his guide go out in the surf in a small boat. The angler uses a reel and a rod about seven feet long. He sets his hook afloat baited with a small mullet and waits in the shallows, it may be for hours, before he gets a strike. When the fish once seizes the bait, it is necessary to allow him to drag the boat until he is exhausted. The tarpon varies towing by magnificent leaps from the water. Possibly an hour or more may be required to land. More often the fish succeeds in breaking the tackle and escaping. Many a fifty-dollar outfit has been dragged off into the Gulf. Specimens of this fish weighing more than 200 pounds and having scales that measure more than four inches across are frequently taken with the light tackle described above, the battle being hardest when the rod and line are lightest. Certain points on the Coast of Cuba, Corpus Christi, Texas, and Tampico, Mexico, are also tarpon-fishing grounds. The glittering scales are ordinarily the size of a silver dollar. They are much used in fancy work and are a considerable source of revenue to the fishermen. See FISH.

Tarrytown, a village on the east bank of that part of the Hudson known as Tappan Sea. It is twenty-four miles north of New York City. A monument marks the spot where André was captured. Sleepy Hollow, made famous by Washington Irving, lies north of the village. Sunnyside, his residence, is situated to the southward. See ANDRE; IRVING.

Tarshish, in sacred geography, a far-

distant locality known to the sailors of Tyre and Sidon. "Ships go down to Tarshish," says Holy Writ. Tarshish lay beyond the pillars of Hercules, that is to say, west of the Strait of Gibraltar. The locality has been identified with the district about the mouth of the Guadalquiver in the south of Spain.

Tartan, tär'tan, or **Plaid,** cloth woven in a checkered pattern. The checks are produced by bands of different colors running side by side in both the warp and weft. It is, in all probability, the most ancient form of ornamental weaving. The Highlanders were noted for tartans produced from the long wool of the Highland sheep. A shepherd never thought of taking to the hills without a shepherd's plaid or blanket. It served him both as tent and cloak. Each clan had its own pattern. The Campbells, for instance, could be told from the MacGregors by their tartans. In time of warfare the clan tartan served as a uniform. See HIGHLANDS; BAGPIPE.

Tartar. See CREAM OF TARTAR.

Tartars, tär'tärz, or **Tatars,** a term applied with little discrimination to the inhabitants of the steppe region of eastern Russia and central Asia. It is difficult to distinguish between Tartars, Turks, Mongols, Talmucks, etc. Under Genghis Khan the rule of the Tartars extended from the Chinese coast on the Pacific so far westward as to include Poland. Tamerlane or Timur was another great leader of the Tartars and allied tribes. The late ruling dynasty in China was quite possibly of Tartar origin. The Great Wall of China was built to keep these people out of the fertile valleys of the "Flowery Kingdom." See STEPPE; TIMUR; CHINA; GREAT WALL.

Tartarus, tär'ta-rus, in Greek mythology, a sunless pit as far below Hades as earth is below Heaven. After Zeus had overthrown Cronus he imprisoned that god, together with the Titans, in Tartarus, closing the pit with gates of adamant. The later poets describe Tartarus as that part of the infernal regions where the shades of the wicked are punished. The word is used sometimes as synonymous with Hades. See HADES; ZEUS; CRONUS.

Tarte, Joseph Israel (1848-1909), a Canadian editor and statesman, was born at Quebec and educated at L'Assomption College. After completing his legal preparation in 1871, he evinced an interest in journalistic work, and became connected in an editorial capacity with *Le Canadien,* and later with *L'Evenement.*

For many years he was a Conservative politically, but when in 1891 he became a Liberal, he was a very ardent one. While serving as a member of the Legislative Assembly of Quebec in 1877, he suddenly and violently attacked the administration of Sir John A. Macdonald, his political superior. He voiced his dissatisfaction with the corruption which he believed to exist. As a result, he lost favor with the Conservatives, and was obliged to sever his affiliation with the party.

However, when the Liberal forces, under Laurier, came into power once more in 1896, Tarte became Minister of Public Works, an office which he held with credit until 1902. For some years subsequently he edited several periodicals, most of which were successful. He also was political editor of *La Patrie* in Montreal.

Tartuffe, tär-tŭf', a religious hypocrite in Molière's comedy of *Tartuffe.* The French tragedian has drawn his character so well that "Tartuffism" has become a general name for the practices of a hypocrite. See MOLIERE.

Taschereau, Elzéar Alexandre (1820-1898), a Canadian Catholic prelate and the first Canadian to become a cardinal, was born at Sainte Marie de la Beauce, Quebec, and studied at Quebec Seminary. Ordained a priest in 1842, Taschereau began a term of service with Quebec Seminary that lasted almost thirty years. He was at first professor of moral philosophy, but after 1860 was superior of the school, as well as rector of Laval University. Taschereau was made vicar-general of the diocese in 1862, and in 1871 was made archbishop. He founded a convent and hospital at Quebec in 1872, and fourteen years later he was raised to the rank of cardinal. In 1894 he retired from the active administration of his diocese.

Tashkent, the capital of Russian Turkestan. The ordinary reader is so apt to picture all Turkestan as a dreary waste of rock and sand that it is worth while to

form an adequate picture of this city and the region in which it is situated.

Tashkent is very near the geographical center of Asia. It is situated near a branch of the Sir Daria, the Jaxartes of the ancients. This river and its affluents supply water for a population of 3,000,000 prosperous people. The city came into the hands of the Russians about 1865. The population is about 180,000, of whom about 12,000 are Russians.

The city is divided into old Tashkent and new Tashkent, the latter being the Russian quarter. It looks much like a Russian city. A stream from the mountains thirty miles away provides the city with an abundance of water. Numerous canals carry it to all parts of the city.

The houses are built of adobe. They are covered with plaster and are decorated with kalsomine in bright colors. Pink and blue are favored tints. The roofs are made of poplar rafters thatched with reeds. Each house is surrounded by a garden inclosed by a wall. The gardens and the canals take up so much room that the streets are oftentimes reduced to mere paths completely embowered with overhanging foliage.

Travelers describe the city as clean. In this respect the people and the streets have a Japanese aspect. There are no beggars. The citizens are not highly educated but all children are taught to write and to read the native literature. There are said to be nearly 5,000 shops for the sale of goods. The city is so distant from other centers that there are few visitors, and no attempt is made to display merchandise or curios to tempt the stranger. The men wear skull caps and coats of silk or cotton woven in all the colors of the rainbow. The women go about after the Mohammedan custom with their heads so wrapped up that their features are indistinguishable.

Tashkent is the terminus of a branch of the Trans-Caspian Railway which was built into the country by the Russians. The old walls are now in ruins. The principal public buildings are large mosques, a central bazaar or fair, several colleges, and a few old temples. The Russian quarter is quite modern. The streets are broad and well kept. There are electric lights, trolley lines, a public library, a museum, and an arsenal.

The surrounding population is employed in raising rice, cotton, and corn. The citizens are engaged largely in weaving cotton and silk goods, in tanning leather, and in manufacturing articles of leather and felt. There is an extensive trade with the surrounding region and with Russia.

Tasmania, tăz-mā′nĭ-a, an island 140 miles south of Australia. It constitutes a state of that commonwealth. It was discovered by Tasman, a Dutch navigator, in 1642. He called the island Van Diemen's Land, but the name was changed subsequently in his honor. Area, 26,215 square miles. It is as large as the mainland of Scotland. Tasmania is noted for mineral wealth. Wheat is the principal crop. Minerals, wool, timber, fruit, and grain are the chief exports. A million dollars' worth of apples are shipped yearly to the London market. The plants and animals resemble those of southern Australia. An animal not found elsewhere is the Tasmanian wolf. In 1804 England began to banish criminals to Tasmania, a policy which was followed until 1853. It is a mountainous land, called sometimes the "Switzerland of the south." Lofty plateaus, mountain peaks, glens, waterfalls, alpine lakes and forests combine to form the grandest of scenery. As the island lies farther to the south, the climate is colder and the air more invigorating than that of Australia, to which it serves as a summer resort. Over a hundred thousand tourists visit the island each summer. There are excellent macadamized roads. Automobile trips are popular. The capital and principal port is Hobart, of which a distinguished traveler says: "It is surrounded by hills and mountains, from which views may be had that would make the fortune of any district in Europe, and the air of Hobart is perfect here." The population of the island in 1920 was 213,177. The original inhabitants, the Tasmanians, are extinct. See AUSTRALIA.

Tasmanian Wolf, a flesh-eating, pouched animal of Tasmania. It is remotely related to the American opossum. It has the general appearance and, we may add, the disposition of a wolf. The muzzle is pointed. The tail is long and tapering

but not prehensile. The fur is dark and, in general, a grayish brown with black stripes across the back. This animal is strong, fleet, and cunning. In the daytime it skulks away in rocky regions or hides in caverns. At night it prowls about and attacks flocks, creating havoc among the sheep. Shepherds dread the raids of this "wolf," and have nearly exterminated it.

Tasso, Torquato (1544-1595), a celebrated Italian poet. He was born at Sorrento, Italy, March 11, 1544, and died at Rome, April 25, 1595. He was educated by the Jesuits at Naples and Rome and studied law at Padua. Obtaining his father's consent to abandon law, he pursued his literary studies at the University of Bologna. His is one of the great names in Italian literature. His chief work is *Jerusalem Delivered,* an epic poem, celebrating the heroic deeds of the First Crusaders. He was attached to the household of various princely patrons, but became the prey of delusions, one of which was that he was an unpardonable heretic. In 1578 he was placed in an insane asylum, but was subsequently released. Goethe's German tragedy of *Tasso* is based on a story current to the effect that Tasso was shut up, not for insanity, but because he aspired to the hand of a certain duke's sister. Like many other poets, he led a troublous, passionate life and died unhappy. His portraits represent a dark, slender, intellectual, but rather restless man, wearing a rich habit. See TANCRED; CRUSADES; EPIC.

Taste, one of the five special senses. See TONGUE.

Tattersall's, a noted London auction mart for horses. This horse market was founded in 1770 by Richard Tattersall. Since 1865 it has been at Knightsbridge Green. Horses are sold at auction every Monday of the year, and in spring a second weekly auction is held on Tuesday. Tattersall's is headquarters for sporting men. It is the center of all matters relative to British horseraces and betting, quite as Wall Street is the financial center of the United States.

Tattooing, the process of marking the surface of the body with indelible patterns made by pricking the skin and inserting various coloring materials. Sailors have been accustomed from time immemorial to tattoo love emblems, names, anchors, and the like on the arm and wrist in India ink. The pigment eats into the skin and dyes it so permanently that it can neither be washed out nor carried away by the absorptive processes of the body. Of civilized peoples, the Japanese have been most addicted, until of late, to the practice. The women of the upper Nile Valley tattoo their bodies extensively. Tattooing has been carried to its greatest extent among the people of the South Sea Islands. The word is of Tahitian origin. The Tahitians, the Dyaks of Borneo, the Fiji Islanders, the inhabitants of the Solomon group, and the Papuans of New Guinea are noted for the extent to which they tattoo their bodies. The Maoris of New Zealand, in particular, covered the body with fantastic designs until their skins were as brilliant as oriental rugs. The younger generation have ceased to decorate the body in this fashion.

Tauchnitz, Karl (1761-1834), a German printer and bookseller. He was an uncle of Tauchnitz, the publisher. In 1797 Karl Tauchnitz set up a printing shop at Leipsic. A year later added a book stall, and in 1800 he began the manufacture of type. He printed editions of the Bible and of the Koran and a series of Greek and Latin classics noted for the correctness and beauty of the text.

Taunton, Mass., a manufacturing city and the county seat of Bristol County, is at the head of navigation on the Taunton River, and is on the New York, New Haven & Hartford Railroad, 36 miles south of Boston. It has good steamer connections with points up and down the coast. The leading manufactures are cotton products, oilcloth, tacks, silver, copper ware, stoves and stove linings, bricks, kitchen utensils, cutlery, machinists' tools, nails, eyelets, jewelry, twist drills, buttons and printing presses.

It contains St. Mary's Academy, Bristol Academy, a high school, graded public, and parish schools, and a library. The State Hospital for the Insane is located here. The city was settled in 1638 under the name Cohonnet, its name being changed to Taunton when it was incorporated the next year. Population, 1920, 37,137.

TAXATION

Taxation, the process of collecting money to carry out the purposes of the government. There are two ways of looking at taxation. According to one view, taxes are an exaction; according to the other they are a contribution. The worst system of taxation known to the historian is probably that of farming taxes out for collection to court favorites. The Romans and other ancient peoples assigned provinces to tax collectors. The collector was placed under contract to bring a fixed sum into the treasury, and was then turned loose to wring as much more as he could from the oppressed peasantry. The fiscal system of Turkey is based on taxes imposed arbitrarily. The Tudor and earlier Stuart sovereigns of England did not hesitate to exact forced loans from people of property. The officers proceeded on the theory that, if a man lived economically, he could not have failed to save money and was therefore in a position to make his sovereign a handsome contribution. If, on the other hand, he lived extravagantly and ostentatiously, he evidently possessed means and was, therefore, in position to assist his king. A dilemma like the one referred to was known during the reign of Henry VII as "Morton's Fork." According to all such views, it is difficult to draw the line between taxation and plunder. The theory that taxation was an injustice, or at best a misfortune, prevailed throughout the ancient world and has not disappeared entirely even yet. So far as the common people of England have taken part in the several wars of that country, they have been stirred up largely by questions of taxation. The American Revolution was fought to escape English taxation. The French Revolution was an uprising of the common people against the taxation of the ruling classes. Aside from questions of ambition and glory, most wars of conquest have been waged for the privilege of taxing somebody.

According to the second view of taxation, taxes are necessary, but may be levied properly only by consent of the taxed. This view has been crystallized in the expression "Taxation without representation is tyranny."

Adam Smith in his *Wealth of Nations* has laid down four oft-quoted principles of taxation. In a simplified form they may be stated as follows:

1. Each taxpayer should pay in proportion to his ability.

2. The manner and amount should be made public, and a fixed time for payment set.

3. The time and place of payment should be chosen with a view to convenience of the taxpayer.

4. The expense of collection should be as low as possible.

Some hold that a government should get on by spending the least possible amount; others claim that an enlightened government should aim to do much for the people and that liberal funds should be provided for the purpose. This latter view is often spoken of as paternalism. If the government is to act merely as a policeman to keep order, it is evident that less money is needed than if schools, roads, water supply, and other public necessities are to be maintained by taxation. The most enlightened view of taxation is that of people putting their money together, each according to his ability, to carry out a plan agreeable, if possible, to all; if not, at least to a majority.

Taxes are divided into two general classes, indirect and direct. The indirect tax is a tax paid by one who is expected to collect it in turn from someone else with whom he does business. Although the Constitution of the United States permits Congress to levy direct taxes, this method has been resorted to only in time of war. At the present time the government relies largely upon the forms of indirect taxation known as customs and internal revenue. Merchants are required to pay customs duties on imported articles, chiefly of wool, silk, cotton, iron, copper, tin, and on lumber, sugar, fruits, liquors, tobacco, drugs, and chemicals. They are expected to raise the price of their goods correspondingly and thus reimburse themselves from their customers. The federal government also levies taxes on manufactures of tobaccos, liquors, oleomargarine, and playing cards. The makers are expected to repay themselves by raising the price of their goods. In 1909 a law was passed imposing a tax of two per cent on the net earnings of corporations in excess of $5,000. Taxes within

the various states are ordinarily direct taxes paid to the proper officers by the owner of property. In many states a percentage tax is levied on the gross earnings of corporations, as railroad companies, telephone companies, express companies, etc. In several states, a poll tax is collected. Every able-bodied male person is required to pay a tax. In the United Kingdom much is made of an income tax.

The opinion of economists is divided as to whether direct or indirect taxes are the more advisable. Direct taxation is believed to educate taxpayers. The indirect method attracts the least attention. It is more in accordance with the advice of Colbert, the celebrated finance minister of Louis XIV, who is reported to have said: "Pluck the goose so as to obtain the most feathers with the least squawking."

Taxes may therefore be regarded as enforced proportional contributions levied on persons, property or income, either (a) by the authority of the state for the support of the government, and for all its public or governmental needs, or (b) by local authority, for general municipal purposes. In a more general sense, the word includes assessments on specified properties benefited by a local improvement, for the purpose of paying expenses of that improvement. In the stricter sense, taxes are direct when demanded from the very persons who may be expected to bear their burden; as, for example, poll taxes, land or property taxes, income taxes, and taxes for keeping automobiles, carriages or dogs.

Taxes may be said to be indirect when they are demanded from persons who it is supposed, as a general thing, will indemnify themselves at the expense of others; for instance, when they are levied on commodities before they reach the consumer, and are paid by those on whom they ultimately fall, not as taxes, but as part of the market price of the commodity. Thus the taxes called customs, which are imposed on certain classes of imported goods, and those called excise duties, which are imposed on certain home manufactures and articles of inland production, are indirect taxes.

In the United States, all state and municipal taxes are direct, and are levied chiefly upon the assessed values of real and personal property, while the revenue required for general governmental purposes is derived from direct taxes on incomes and indirect taxes upon certain imports, and upon beverages, tobacco, etc. In Great Britain, the governmental revenues are also derived from both direct and indirect sources — from direct taxes on income, stamps, dogs, etc., from imposts on a few imported articles of consumption, especially tea, spirits, tobacco, and wines, and from excise duties. House taxes, or taxes on rental, form the largest part of the local revenues, municipal revenues being almost entirely raised from this source.

Income Tax. In recent years the income tax has had a peculiar interest for Americans. This is a tax levied upon incomes above a certain specified limit. From 1861 to 1872 an income tax was levied by the United States government under its general constitutional powers, as part of the system of financing the war between the states. As arranged in 1862 incomes under $5,000 were taxed 5 per cent, with exemption of $600 and the amount of house-rent paid; incomes of over $5,000 and not over $10,000 were taxed 7.5 per cent, and those over $10,000 were taxed 10 per cent, without exemption. There were various modifications of the tax; in 1865 the exemption limit was raised to $1,000 and in 1870 to $2,000.

On February 25, 1913, the Sixteenth amendment to the United States Constitution became effective. This provided that "the Congress shall have power to lay and collect taxes on incomes, from whatever source derived, without apportionment among the several states, and without regard to any census or enumeration." Under this constitutional provision the United States now collects income taxes which have been the subject of several acts of Congress, the last of which was the Internal Revenue Act of 1921, which made important amendments to the act of 1918, passed during the period of the World War. Under the present act, the following persons are required to make annual returns of income on forms prescribed by law:

(1) Every individual having a net in-

come for the taxable year of $1,000 or over, if single, or if married and not living with husband or wife (even though entitled to an exemption as head of a family);

(2) Every individual having a net income for the taxable year of $2,000 or over, if married and living with husband or wife; and

(3) Every individual having a gross income for the taxable year of $5,000 or over, regardless of the amount of his net income.

If a husband and wife living together have an aggregate net income for the taxable year of $2,000 or over, or an aggregate gross income for such year of $5,000 or over, each must make a return unless they file a joint return, as provided by the revenue act.

The tax on the income of individuals consists of two parts. The first part, affecting most persons, is called the normal tax. For instance, every single person, unless he happens to be the head of a family, receiving a net income for the taxable year of more than $1,000 must pay the normal tax. The normal tax is at the rate of 4 per cent on the first $4,000 (or part thereof) of net income over exemptions, and at the rate of 8 per cent on the remainder of the net income.

Every person who is the head of a family, that is, who is supporting in his household a child or other dependent, and every married person living with husband or wife, has an exemption from normal tax of $2,500, unless the net income is in excess of $5,000, in which case the exemption is $2,000. This exemption is also only $2,000 when the aggregate net income of the husband and wife is over $5,000. In addition, a married or single person receives a credit for normal tax of $400 for each dependent child under 18 years of age, or other dependent person physically or mentally defective. The status on the last day of the year determines the exemption.

The personal exemption applies to the combined income of a husband and wife living together and their minor children, with only one $2,000 or $2,500 exemption for the family; but each member of the family is entitled to the 4 per cent rate upon $4,000 of his separate income, before the 8 per cent applies, provided separate returns are filed. In addition to the normal tax, there is a surtax upon net incomes of more than $6,000, at graduated rates, up to 50 per cent on additional net incomes of over $200,000.

Income is defined by the law to include gains, profits, and income derived from any source whatever. However, it represents only additions to wealth, and does not include money received in return or in exchange for wealth already owned in a different form. For example, if a man receives $500 in payment of a note which he has held as security for money loaned, such payment is not income, because he already was worth the value of the note; but if he receives $30 as one year's interest on that note, the interest is income, because it is what his investment has earned for him.

All that a person receives in the way of taxable gains or profits makes up the "gross income," which will therefore be the entire salary, interest, rent, or other amounts received. The law then specifies certain "deductions" which are allowed, such as expense of business, taxes, and interest paid. The remainder is called the "net income." The net income must be determined in accordance with instructions on the official return blank, and by showing in exact figures the total gross income and the several deductions. For the purpose of computing the normal tax, the personal exemption of $1,000, $2,000, or $2,500 and the credit for dependents are deducted from the net income.

It is required that the returns for income tax be filed with local collectors of internal revenue on or before March 15 in each calendar year, and the tax is due in four equal installments, unless paid voluntarily in one lump sum. The due dates for installments are March 15, June 15, September 15, and December 15. If any installment is not paid when due, the whole amount of the tax becomes due and payable upon notice and demand by the collector.

The total number of personal income tax returns filed in the United States for the taxable year 1920 was 7,259,944 repre-

senting total net incomes of $23,700,000,000. The total tax paid in that year was $1,075,053,686, of which $478,249,919 was normal tax and $596,803,767 was surtax. Income tax returns from corporations in 1920 numbered 345,595 and the taxes paid amounted to $1,625,234,643, representing corporate incomes amounting to $7,902,654,813. Income tax returns are required from all corporations in much the same manner as from individuals. The income tax on corporation is at the rate of 12.5 per cent of the net income in excess of certain credits provided in the law.

Other taxes collectible by the United States include estate taxes, taxes on beverages, cigars, tobacco and manufactures thereof, taxes on admissions and club dues, stamp taxes, and a number of special taxes, most of which were imposed to assist in defraying war expenditures. A number of special taxes are also imposed by the various states, including in most cases taxes on corporate enterprises, inheritance taxes, and taxes on automobiles, etc. See CUSTOMS; GEORGE, HENRY; SOCIALISM; OCTROI; INCOME TAX; TARIFF; UNEARNED INCREMENT; PROTECTION; ASSESSOR.

Taxidermy, the art of preparing and filling out the skin of an animal in order to present a counterpart of life. The skin is removed, cleaned, and treated with preservatives which prevent hardening as well as decay, and then mounted with artistic effect and scientific finish and accuracy. After the flesh has been scraped away from the bones, the skeleton is placed in its natural position, built up in tow, excelsior, or other filling, and the skin is drawn over it once more. Great skill is required in making this artificial body, but many of the life-like specimens in the large museums of the world testify to the fact that the art of taxidermy has already reached a high state of perfection, though much remains yet to be done by those possessing artistic instinct and an eye trained to observe animal movement and expression.

The National Society of American Taxidermists was organized in 1880, in Rochester, New York. Prof. Henry A. Ward's establishment, known as the Natural Science Establishment, was the nucleus of the work in taxidermy in America, and he lent generous support to this new association, the National Society. Other museum officers who stand foremost in the progress of the work are Prof. Spencer F. Baird and Dr. G. Brown Goode.

Taxonomy, in systematic botany, is that branch of natural science which deals with the classification of plants. To obtain a natural and exact arrangement, the structure and genetic relationship of plants must be known, hence taxonomy becomes a highly specialized division of the science of morphology. In 1583 Cesalpino, an Italian physician, who had made an extended study of plants, published a lengthy report in the form of an artificial classification. Linnaeus also resorted to artificial grouping, basing his division on the number of stamens and pistils in the flower. His *Species Plantarum* appeared in 1753. The modern system of classification, which has supplanted the Linnaean, is natural, rather than artificial, and has developed as a result of wide examination of species and of consideration of genetic and geographic relationships.

Tay, a river in Scotland. One of its sources is Loch Tay, a picturesque sheet of water in the County of Perth. This loch is about fifteen miles long and a mile wide. It is from 100 to 600 feet deep and is well stocked with fish. Other lochs contribute their waters to the River Tay which flows eastward into an estuary and is about 120 miles in length. The estuary is navigable for ships. It is crossed by a railway at Dundee.

Taylor, Bayard (1825-1878), an American writer. He was a native of Pennsylvania, and may be said to have had a high school education. At the age of nineteen he set out for a two years' tour in western Europe. He wrote articles for several American newspapers, afterward publishing them in a volume under the title of *Views Afoot, or Europe Seen with Knapsack and Cap.* On his return he worked on the staff of the New York *Tribune,* and was sent to California to write up the excitement attendant on the discovery of gold. These articles he published in 1850 under the title of *Eldorado.* In 1851 he revisited the Old World, passing through Egypt, Asia Minor, India, China, and Japan. On

his return, he published *A Journey to Central Africa, The Land of the Saracens, A Visit to India, China and Japan.* From time to time he wrote short tales and essays. In 1857 he visited Scandinavia, writing up his experience under the title of *Modern Travel.* In 1862 he received a diplomatic appointment at St. Petersburg, and in 1878 was made United States Ambassador at Berlin. His *Translations of Faust* is one of his best known works. He wrote several novels, including *Anna Thurston* and *John Godfrey's Fortunes,* and a *History of Germany.*

Taylor, Jeremy (1613-1667), an English theologian. He was born in Cambridge, England, was graduated from Caius College in 1631, ordained in 1634, and made a fellow at Oxford two years later. During the Civil War he was chaplain in ordinary to King Charles I, and in the years which followed he served as chaplain to Richard Vaughan. He lived in Wales, where he supported himself by teaching a school in Newton, and later became bishop of Down and Conner. Coleridge called Taylor "the most eloquent of divines." His fame rests on oratorical, rather than on polemic skill. His sermons are now the most widely read of his works. *The Liberty of Prophesying* is a plea for toleration, for private judgment in matters of doctrinal interest. Other important writings are: *The Life of Christ, The Rule and Exercises of Holy Dying, Ductor Dubitantium, or The Rule of Conscience on All Her General Measures.*

Taylor, Zachary (1784-1850), the twelfth president of the United States. He was born in Orange County, Virginia, September 24, 1784. The next year his father, Colonel Richard Taylor, removed to Kentucky. Like Andrew Jackson, young Taylor had little education. When a mere stripling, he received a commission as lieutenant in the 7th U. S. Infantry. He served in the War of 1812, successfully defending Fort Harrison on the Wabash. He held command also in the Black Hawk War of 1832 and in the Seminole War of 1836. When the war with Mexico came on, Taylor, now a general, was stationed with 4,000 soldiers at Fort Brown to await the expected invasion. He received the first attack of the Mexicans at Palo Alto, May 8, 1846, and on the following day won the engagement of Resaca de la Palma. The taking of Monterey followed, September 19th. February 22-23, a part of his army having been withdrawn by General Scott for the invasion of Mexico by way of Vera Cruz, Taylor was attacked by a superior force under Santa Anna and won a creditable victory.

At the conclusion of peace "Old Rough and Ready," as his soldiers called him, was nominated by the Whigs for the presidency. The names of his victories played no little part in the campaign. The "Hero of Monterey and Buena Vista" was elected over Cass, the Democratic, and Van Buren, the Free Soil candidate. The great question of his administration was the disposition of the territory acquired by the war. The various measures, known together in American history as the Compromise of 1850, were still under discussion in Congress July 9, 1850, when President Taylor died.

See WHIG; CLAY; WEBSTER.

Tchad, or **Chad,** a lake in the central part of the African Sudan. Kamerun, French Sahara, and British Nigeria meet here. The lake has several tributaries but no outlet. The greatest length is about 140 miles.

Tchitcherin, George (1872-), Foreign Minister of Soviet Russia, was born in Russia in 1872. He is an aristocrat by birth and training, his father having been Counsellor of the Russian Embassy in Paris. Non-conformist, he left the Imperial Ministry of Foreign Affairs, where he learned the art of diplomacy, to enter the service of the Soviet. He is a prominent figure in the political life of the Russia of today, and negotiated the Russian-German economic treaty, signed April 16, 1922, providing for the cancellation of all war debts and claims for war damages, and cancellation of the Brest-Litovsk treaty. As a Nationalist, he has the support of a large portion of the Russian Intelligentsia, and in his foreign policy he has the support of those who in some of his other projects oppose him.

Te Deum, tē dē′ŭm, or **Te Deum Laudamus,** the first words and title of a Latin hymn of Thanksgiving. The three words mean "We praise Thee, O God."

The hymn or psalm dates not later than the sixth century, and portions of it, at least, are centuries earlier. The Te Deum is sung at morning prayer in the Roman Catholic and in the English Church; also on occasions of special thanksgiving. It is not considered appropriate during the season of Lent. See HYMN.

Tea, tē, the leaf of a Chinese shrub. Several species of the tea plant yield commercial tea. The world's supply comes chiefly from China, Japan, India, and Ceylon. The use of tea was introduced into Europe by the Dutch East India Company about 1601. Tea cost at first over $50 a pound. At present Great Britain and Australia use over 6 pounds a year per person. Great Britain uses 600,000 pounds daily. This means that the British people drink about 4,000,000 gallons of tea daily.

The tea plant flushes or sends out young shoots four times a year. When the shoots have about six or seven leaves they are plucked by hand. The first picking is the best. Of every seven leaves on the shoot, the two at the tip are the youngest, smallest, juiciest, and make the choicest tea. The next leaf is second in grade. The fourth and fifth leaves are called "Souchong," the last or seventh leaf, now seldom gathered, is Bohea. Young Hyson is the crop gathered before the season of rains. Oolong tea comes from the Island of Formosa. Gunpowder is a fourth or fifth leaf tea.

In addition to a name according to the leaf, teas are classified according to the ways they are cured. For black tea, the leaves are withered in the sun, rolled till they are broken and soft, and then rolled into balls and fermented. After fermentation, black tea is sun-dried and fired in an oven. Green teas are withered in the sun and then rolled. They are sweated, but not fermented, and are finally dried by prolonged roasting. Tea is sent to market in neat wooden chests of exceeding lightness. They are lined with tea lead foil to prevent the escape of the aroma.

Tea buyers grow skillful in tasting tea. A professional tea taster commands a high salary. Tea tasters steep the weight of a new sixpence in three and one-half ounces of water. The Chinese say "take water for tea from a running stream," so that it may contain air; and further, "the fire should be lively and clear, but the water must not be boiled too hastily. At first it begins to sparkle like crabs' eyes." Tea should not be taken with heavy meals as it is not an aid to digestion. Cream coagulates and entangles the tannin of the tea, and is not recommended. Sugar has no particular influence. The total tea exports for the calendar year 1920 are given in the following table:

Country	Pounds
British India	270,957,000
Ceylon	184,770,000
China	40,537,000
Japan	24,102,000
Formosa	14,839,000

The finest grade of tea is consumed by the people of China, or transported overland to Russia and sold at high prices. A sea voyage is held to injure the flavor.

Tea culture requires a subtropical climate and sixty inches of rain, well distributed through the year. South Carolina has been found fairly well adapted to tea raising. A plantation near Summerville, under government management, produces 12,000 pounds of high grade tea yearly. Tea culture is profitable, however, only in countries where adult labor commands a few cents a day and children a cent or two. In Ceylon the women and children go up and down the rows, picking tea leaves one by one. In a day, a child picks leaves for a pound of dried tea. In the four pickings some rich Ceylon plantations yield 1,000 pounds of tea per acre.

The United States imports about $20,000,000 worth of tea annually. Canada imports tea to the value of $8,000,000 a year. It is claimed that the average consumption of tea per capita of population of several countries in a year is as follows:

	Pounds.
United Kingdom	6.03
Russia	.94
Holland	1.45
Germany	.11
France	.06
United States	1.30
Canada	4.34
New Zealand	6.38
Australia	5.92

Tea is not placed on plates for drying and withering, but on protected bamboo mats, from which it is impossible for the wind to blow it. Green tea and black tea are prepared quite differently. The

leaf of the green tea, immediately after picking, is partially dried in the sun or by artificial heat, and subsequently, at the pleasure of the tea man, is dried, rolled, and colored in iron pans over a slow charcoal fire. Then the leaf is sifted according to its size and shape, making such grades as Gunpowder, Young Hyson, and Hyson, as known in the foreign markets. After this process is finished it is put into packages or chests, weighing between sixty and seventy pounds, ready for export.

The color of black tea is due in no way to coloring matter, as is commonly supposed, but is caused by the withering or fermentation. Immediately after picking it is slightly withered or fermented by being placed in the sun, and the expertness of the tea man is shown in his being able to know just when to stop the withering or fermentation. After this the leaf is rolled in bamboo trays and fired in pans until thoroughly dry and ready for packing. This tea is packed in chests and half-chests for export, and in case it comes from the tea man in smaller packages, it is repacked to suit the wishes of the purchaser. Tea chests are practically all made in the same manner—of wood, lead lined, and when ready for export are wrapped with coarse Canton mats.

Both tea dust and common grades of black tea are made in the shape of bricks, weighing usually between one and one-half and two pounds. All teas in this shape are exported to Siberia and Mongolia or in a less degree to Russia. The United States does not use tea in this form.

Teachers College. The first teachers college in the United States was founded in 1888 and affiliated with Columbia University, within two years becoming an integral part of the institution. The college filled a recognized need in the education of teachers, since it offered courses in college grades more advanced than those offered by normal schools. A number of state universities followed the lead set by Columbia and a school of education is now connected with many of these institutions. Other large universities, notably Chicago, Yale, and Harvard, have also established schools of education of college grade. Courses in state normal schools have been extended, and in 1920 thirty-seven of the forty-six teachers colleges in the country were formerly state normal schools.

The teachers college maintains a four years' course above the secondary school and is authorized to grant degrees. The college also maintains one or more training schools, in which students are required to teach for a definite period under criticism. The teachers college represents standards and ideals in education similar to those of the best technical schools that stand for the advancement of knowledge of science and law.

Teak, tēk, a tree of eastern India yielding excellent ship timber. Teak is a forest tree, eighty to two hundred feet high, with leaves, flowers, and seeds that establish its relationship to our garden verbenas. Teak timber is light and strong, resembling mahogany in appearance. It is particularly able to withstand the attacks of boring insects. Elephants are employed in Farther India carrying logs of teak balanced across their tusks. One elephant will do the work of many men, picking up his own timber, avoiding obstacles with nicety, and piling with care. All he asks in return is an armful of sugar-cane. Teak is not subject to the attacks of white ants. For that reason it is a valuable railway timber. Oak rusts iron by contact, but teak contains an oil, the same that renders it unpalatable to ants, which preserves iron from rust. Teak wood is desirable, therefore, for all parts of a ship where wood and iron are joined. Singapore is an important teak market. See SIAM.

Teal, tēl, a handsome, undersized, fresh water duck resembling the wood-duck in coloring. There are many species well distributed throughout the world. The species best known to American sportsmen are the blue-winged and the green-winged teal. A third kind is the cinnamon teal. They are much alike in their habits. Relying on their diminutive size and swiftness of flight, they are bolder than the larger mallard or canvasback. In flight, their wings make a peculiar whistling noise. In lighting, they dive promptly into cover without hovering about to detect danger. A flying teal comes down the wind at from 80 to 100 miles an hour. Less dainty in their food than their larger associates, they are known often as mud-ducks. In British Columbia the green-wing haunts the streams, feeding on putrid salmon until it is unfit for table use. In its winter home among the rice swamps of the south, its flesh acquires an exquisite flavor. See DUCK.

Teasel, tēzl, an herb four or five feet high, not related to burdock, but producing somewhat similar heads. The bracts are armed with recurved prickly points. The most common kind, the fuller's teasel, is

used to tease or pull up the nap on woolen cloth. No machinery has yet been devised to take its place. Fuller's teasel commands a regular price and is much cultivated in England, also in New York for sale to the woolen mills.

Technical Education. See INDUSTRIAL SCHOOLS.

Tecumseh, te-kŭm'seh (1768-1813), a noted Shawnee chieftain. He was born near the present town of Springfield, Ohio, in 1768, and was shot in the battle of the Thames, Canada, October 5, 1813. He was a warrior of courage, intelligence, and resource. In 1811, alarmed by the influx of whites into the hunting grounds of his people, and instigated, it is believed, by British officers in the Detroit region, he coöperated with his brother, the Prophet, to form a widespread conspiracy. The settlers in alarm placed themselves under the leadership of General William Henry Harrison, afterward president. He defeated the Indians at the battle of Tippecanoe, November 7, 1811. Tecumseh was absent. Naturally he took the part of the British in the War of 1812. He was given the rank of a brigadier-general. He stirred up the Creeks to fall on Fort Mimms in Alabama and massacre about 400 men, women, and children. While General Andrew Jackson was cornering the Creeks in the Great Horseshoe Bend of the Tallapoosa, Tecumseh was taking part in the military events centering about the western end of Lake Erie. He served at Raisin River, led 2,000 Indians at the siege of Fort Meigs, and commanded the right wing of the British at the battle of the Thames. The conflict took place in the woods. The Americans were the attacking party. Until he fell before the rifles of the American frontiersmen, Tecumseh's tremendous voice could be heard encouraging his warriors to fight on. At his death the Indians fled in dismay.

Tecumseh possessed all the native dignity of an Indian. Meeting General Harrison on one occasion for a conference, an interpreter motioned him to a seat near the General, saying, "Your father requests you to take a seat by him." Tecumseh replied, "The Great Spirit is my father. I will rest on the bosom of my mother," and, drawing his blanket about him with an air of offended dignity, he took his seat, Indian fashion, on the ground.

See SHAWNEE INDIANS; BLACK HAWK.

Teeth, hard bodies developed usually in the jaws of animals and designed primarily for seizing, tearing, or grinding food. The tusks of the boar serve for defense. The tusks of the elephant are used to tear up roots. The tusks of the walrus are used to dig up clams. The beaver uses his front teeth to cut down trees. Worms, snails, and even insects have so-called spiny or hardened structures, but not genuine teeth, growing from sockets. Turtles lack teeth. Birds are without teeth, though fossil remains show that earlier birds had teeth not unlike those of serpents. The anteater and the pangolin have no teeth. The armadillo has no front teeth. Otherwise quadrupeds have teeth. Although true teeth seem to grow from the jaw, they are not bone, but are modifications of the skin, like hair, horn, and claw. They have been compared to the scales of fishes.

Teeth are classified, according to position and shape, into front teeth or incisors, canine or pointed teeth, premolars, and molars or grinders. Man is furnished with two sets of teeth. The first set, known as milk teeth, consists of twenty teeth,—four incisors, two canines, and four premolars in each jaw. The permanent set adds twelve molars,—double teeth or grinders. A child begins ordinarily to cut teeth at six months of age, incisors first, and has a full set at the age of two. It begins to exchange them for the second set at the age of six. The fangs of a milk tooth are absorbed, so that the body of the tooth is pushed off painlessly by the permanent tooth. The last four molars or wisdom teeth come at an uncertain date—from sixteen to twenty-five. The number and kind of teeth is expressed by a dental formula, the numerals above the line referring to the teeth in the upper jaw. The formula for man is as follows:

$$\mathrm{I}\,\frac{2\text{-}2}{2\text{-}2}\,\mathrm{C}\,\frac{1\text{-}1}{1\text{-}1}\,\mathrm{P}\,\mathrm{M}\,\frac{2\text{-}2}{2\text{-}2}\,\mathrm{M}\,\frac{3\text{-}3}{3\text{-}3} = 32$$

that is to say, man has four incisors, two canine, four premolar, and six molar teeth in each jaw,—in all, thirty-two.

The formula for an opossum,

$$I\ \frac{5\text{-}5}{4\text{-}4}\ C\ \frac{1\text{-}1}{1\text{-}1}\ P\ M\ \frac{3\text{-}3}{3\text{-}3}\ M\ \frac{4\text{-}4}{4\text{-}4}$$

indicates that it has ten incisors in the upper jaw and eight in the lower. The hare has incisors and molars only. The ox and the sheep have no front teeth in the upper jaw. A lengthened incisor is called a tusk. A tooth channeled or folded to permit a flow of poison is called a fang. The roots are known also as fangs.

A tooth consists of a hardened outer portion of dentine and an inner cavity filled with pulp, nerves, and blood vessels. Ivory is a particularly fine, hard variety of dentine. The wearing surface of the tooth, called the crown, is covered usually by a hard layer of dentine known as enamel.

Toothache may arise from inflammation of the fang or from a decay of the dentine and exposure of the nerve. In the latter case, a bit of cotton dipped in chloroform or oil of cloves may be pushed into the cavity to allay the pain.

For fear of injuring the dentine, metallic toothpicks should not be used. The best toothpicks on the market are made from the white birch of Maine, the orange-wood of Portugal, or the reeds of Japan. The care and repair of the teeth forms the distinct profession of dentistry.

See DENTISTRY; SQUIRREL; IVORY; BEAVER.

Tegner, tĕg-nâr′, **Esaias** (1782-1846), a Swedish poet. He was born in the county of Wermland. He was educated at the University of Lund and became professor of Greek literature. Later he was ordained priest and was appointed bishop of Wexiö in 1824. His first literary work, *War Song for the Militia of Scania,* appeared in 1808. *Svea,* a poetical name of Sweden, *The Children of the Lord's Supper,* which has been translated into English by Longfellow, *Axel, The Gotha Lion,* called the national song of Sweden, and *Frithjofs Saga,* are other titles. *Frithjofs Saga* is a cycle of romances in epic form, based upon the Old Norse saga of the same name. The Gothic school of poets founded by Geijer claim Tegner as their most famous representative and he is without doubt the greatest of Swedish poets. See GEIJER.

Teheran, or **Tehran,** the capital city and metropolis of Persia. It is situated on a plain sixty-six miles south of the Caspian. East and west travel, that might otherwise have built up a city at the south end of the Caspian, is thrown to the south by the Elburz mountains and passes through and builds up Teheran instead. Lofty peaks, one of them rising to a height of 20,000 feet, may be seen from the city. Teheran is an ancient center of the caravan trade. The old walls have been leveled to build promenades and new walls have been constructed to inclose an area of about ten square miles. Camel routes enter twelve gates and continue as streets to a central bazaar. The characteristic architectural feature of the city is the Mohammedan mosque. The palace of the shah with extensive grounds, adorned with trees, flowers, and fountains, is connected with a citadel by walls. This royal inclosure is known as "the Ark." Water is brought from the mountains by improved conduits. Gas was introduced in 1902. Tramways connect various suburbs with the city. An east and west railway is expected, in the near future, to connect Teheran with Calcutta and Constantinople. There are manufactures of rugs, silk and cotton goods, and implements. The merchants of the bazaars display a tempting variety of Persian and foreign goods. Coal is mined in the vicinity. Teheran is a market for fruit, wheat, barley, and rice. Teheran is, as Persia goes, a revolutionary center. The citizens have forced the shah to grant a constitution. They take pride in the fact that Haroun-al-Rashid was born here, and they are not insensible to the marvelous remains of former Persian architecture. In the heated seasons the wealthy reside in a suburb in the foothills of the Elburz range. The British legation occupies a palatial building in the city. The Moslems maintain a celebrated Koran school. There is also a polytechnic college taught by European professors. Before the Great War, European nations, particularly Germany, were acquiring a strong influence in Persia. Since the close of the War, Great Britain has exerted the dominating influence. As late as 1921 the Bolshevists were trying to gain control. Population, 220,000.

TELEGRAPHY

Telegraphy, as generally understood, a method of sending words by means of an electric current. Beginning with the discovery of chemical electricity by the Italian Volta in 1774, steady progress was made toward the invention of a telegraphic system. Oersted's discovery of the influence of an electric circuit on the magnetic needle in 1820 and the invention of the electro-magnet were important steps. A number of methods for electric signaling were devised, but they were regarded as scientific playthings. In 1752 Benjamin Franklin, for instance, succeeded in sending electrical shocks across the Schuylkill River. In 1831 Joseph Henry, later connected with the Smithsonian Institution at Washington, constructed a magnetic telegraph a mile long. He trained his wire around the walls of a room in the academy at Albany, New York, in which he taught.

It remained for S. F. B. Morse of the University of New York City, and his friends, March 4, 1844, to construct the first practical telegraph line. It extended from Washington to Baltimore. The first message was a sentiment. The second was an announcement that James K. Polk had been nominated for president by the Democratic convention then in session at Baltimore. In the same year Charles Wheatstone of King's College, London, established local lines in London. His system is still in use. The instruments and the code devised by Morse are in use in the United States and Canada. What is known as the Continental Code prevails in Europe.

The essential parts of the telegraph are an electric circuit, a current, a sending instrument, and a receiving instrument. A line wire grounded at each end and the earth form the circuit. The current is generated by an electric battery. The sender breaks the circuit by depressing and releasing a key. The same result might be attained by breaking the line wire and bringing the ends together and separating them with the hands. The receiving instrument is composed of an electro-magnet placed within a coil of the circuit wire, and an armature held away from the magnet by a slight spring. When the operator presses the key, he closes the circuit; the electric current passes instantly and magnetizes the core of the electro-magnet in the receiving office. The armature is attracted. When the operator releases the lever of his key the circuit is broken, the current ceases, the core of the electro-magnet loses its magnetism, and the armature is released with a click. By repeating the operation a succession of clicks is made, readily interpreted by the receiving operator. The operator reads, not by clicks, but by intervals between clicks. A short interval and a long interval, that is to say, a dot and a dash, constitute the letter "A"; a long interval and three short intervals, that is to say, a dash and three dots, make the letter "B," etc. By attaching a needle point to the armature of the receiving instrument, and allowing it to play on a traveling tape of paper, it may be made to trace long and short marks, that is to say, dashes and dots, corresponding to the intervals. Practical operators depend on the ear.

There are many adjuncts, such as local circuits set in operation by the main circuit, dynamos in place of a battery to create the current, devices for sending several telegrams at the same time and for sending telegrams in opposite directions at the same time, etc., but the essential features of a telegraph system are as described.

In the United States the telegraph service is entirely in the hands of private companies, with the exception of municipal fire and police alarm systems. The first company, organized by friends and supporters of Mr. Morse, was established in 1845, under the name of the Magnetic Telegraph Company, and operated a line between Philadelphia and Morristown, N. J., which was soon extended to New York. The Western Union Telegraph Company was organized in 1856 by a combination of several of the pioneer companies operating as far west as Michigan and the Mississippi River. The first telegraph line across the continent was completed in 1862. The Postal Telegraph Company was organized in 1885 by John W. Mackay, to operate a few lines in the eastern states and one transatlantic cable, and this company gradually extended its service to include every important city in North America, besides operating seven transatlantic cables, a Paci-

fic cable, and lines to the West Indies. The great bulk of the commercial telegraph business of the country is now done by the Western Union and Postal Telegraph companies, although at last report there were 21 land telegraph companies or systems operating commercially.

These American telegraph companies own and operate over 241,000 miles of pole line, exclusive of pole line wholly used by railroads. The number of miles of single wire owned and leased reaches the great total of 1,888,793; the number of telegraph offices is placed at 28,865, and the number of messages handled in a recent year was 155,263,200. The average number of employees in the service of the land telegraph companies is 49,600. There are approximately 314,320 miles of telegraph wire wholly owned and operated by railway companies for their own business. Wireless telegraph business is not included in these statistics.

There are six American companies operating ocean cable systems, with 46,950 nautical miles of ocean cable. The number of cable messages sent in a recent year was 2,913,250, and the total income of the companies was $16,749,058. The average number of employes of the cable companies is approximately 2,000, and the value of their property is over $136,000,000.

Recent developments in wire telegraphy include the sending of autograph signatures, portraits, etc., by the use of special instruments, multiple wires, etc. Submarine telegraphy involves many variations from land practice, and is comparatively slow in its operation, although inventive genius has overcome many of the early difficulties that attended operation of the submarine cable systems, having gradually lessened the expense of cabling and increased the rate of transmission to an appreciable extent. Both the sending key and the receiving devices used in submarine telegraphy are of special character, designed to overcome the resistance offered by a cable which may be several thousand miles in length.

In European countries the telegraph lines are owned by the state and are operated as a part of the postal system.

The author of the book of Job wrote, "Canst thou send lightnings, that they may go, and say unto thee, 'Here we are.'" In the face of such figures, these words seem almost prophetic.

TELEGRAPHIC ALPHABET.

A ·—	B —···	C —·—·
D —··	E ·	F ··—·
G ——·	H ····	I ··
J ·———	K —·—	L ·—··
M ——	N —·	O ———
P ·——·	Q ——·—	R ·—·
S ···	T —	U ··—
V ···—	W ·——	X —··—
Y —·——	Z ——··	& ·——··
, ·—·—·	? ··——··	. ·—·—·—

TELEGRAPHIC FIGURES.

1 ·———·	2 ··——·	3 ···—·
4 ····—	5 ·····	6 —····
7 ——···	8 ———··	9 ————·
	0 —————	

See CABLE; MARCONI; MORSE; MAGNET; ELECTRICITY; WIRELESS TELEGRAPHY.

Telemachus, in Greek mythology the son of Ulysses and Penelope. The story runs that after Ulysses left home, to be gone for many years, Telemachus searched for him tirelessly, under the guidance of Athena, one of Ulysses' best friends. His principal reason for seeking his father was that together they might rid the dwelling of numerous suitors who sought the hand of the fair Penelope in the absence of her husband. Ulysses returned to Ithaca disguised as a beggar, and after a series of meetings with his son, divulged his identity. Together the two men plotted the destruction of the tireless suitors, who were thus disposed of.

In a later legend it is related that Telegonus, the son of Ulysses by Circe, was sent to Ithaca to find his father, and not recognizing him, slew him. Returning to Circe's island, Telegonus married Penelope, and Telemachus Circe.

Telemeter, an instrument used by engineers and artillerymen to determine distances. Surveyors use the telemeter in gauging distances of far-away objects. The work is done with mirrors and telescopes, by means of which angles are read and their distances estimated. Obviously, in planning a military campaign, the artilleryman makes extensive use of this method of approximating distances.

The telemeter used by the United States Coast and Geodetic Survey is a remarkable structure, consisting of a telescope with two extra cross wires placed horizontally, which intercept divisions on the vision. By a multiplication of the shifting figure by the positive factor, the distance of the rod from the instrument is obtained, a figure which is accurate at a ratio probably of one part in 700. The telemeter is of invaluable service in the making of rapid surveys, when time is an object.

Telepathy, a word coined by the Society for Psychical Research, meaning the faculty possessed by some persons of communicating with each other at a distance by thought alone. These phenomena occur quite frequently at the moment of death, the dying person showing himself to friends, etc. But the verdict of science is "not proven." Numerous instances are recorded by such writers as Hyslop, Myers, and others.

Telephone, tĕl′ē-fōn, an instrument for the transmission of sound, particularly the human voice, to a distance. The modern telephone has been developed from a simple device known for a century or two as the "lovers' telegraph." Boys make one by removing the tops from old fruit cans and connecting the bottoms by means of a string. It is well to rub the string with rosin. By talking into the mouth of one can, the vibrations are carried along the string for some distance and may be heard by holding the mouth of the second can to the ear. This rude device through which boys shouted back and forth to each other was improved by the substitution of a wire for the string and by replacing the bottoms of the cans by more delicate membranes. Prior to the invention of the telephone several thousand of these instruments were used in commercial cities as substitutes for speaking tubes. Under favorable conditions a voice could be heard at a distance of three or four miles.

The honor of inventing the electric telephone does not seem to belong to any one person. As early as 1819 Charles Wheatstone of London invented an instrument which he called the telephone, by means of which he was able to cause the music of an orchestra to be heard at a distance. Others worked on the problem of transmitting music. Elisha Gray of Chicago devised a method of transmitting sounds by electricity. The invention of the commercial telephone is credited, however, to Dr. Alexander Graham Bell of Boston. In 1874 he hit upon the idea while conducting experiments designed to make sounds visible to the deaf and dumb. Important improvements were suggested by others, notably by Thomas A. Edison.

Without going into the details of construction, it may be said that the essential parts of a telephone system are a transmitter and a receiver placed in an electric circuit, as in telegraphy. One line wire, grounded at each end, is sufficient. The earth completes the circuit. This style is obsolete, however, two wires now being used, making what is called a metallic circuit. The sender of the message speaks directly into the transmitter. The voice sets in motion a delicate diaphragm. As it approaches and recedes, the vibrating diaphragm strengthens and weakens the force of an electro-magnet, causing pulsations in the electric current. The electric current strengthens and weakens an electro-magnet at the other end of the line. This second electro-magnet attracts and releases a second diaphragm, thus duplicating in the receiver the vibrations set in motion by the human voice. By holding the second diaphragm, that is to say, the receiver, to the ear, it is possible to hear the voice of the speaker miles, and we may say, even hundreds of miles, distant. Persons in Chicago and Boston converse back and forth without difficulty.

Dr. Bell patented his invention. A company known as the Bell Telephone Company was incorporated and for many years maintained a monopoly. In 1893 there were about 600,000 telephones in the United States. The expiration of the prin-

cipal patents enabled independent companies to enter the field. In 1919 there were in the United States 27,298,026 miles of wire and 10,992,325 telephones and over 30,000,000 exchange messages daily. The value of plant and equipment was $1,435,912,142, and it required 187,458 employes to operate the system. Canada has about 900,000 miles of wire and over 370,000 telephones. The miles of telephone lines in the United States equal nearly twice the number of telephone lines in all the other countries of the world.

The uses of the telephone are manifold. On many railway systems it has replaced the telegraph for operating trains. By its use on a large ship, the commander is placed in touch with every department of service on his vessel. Its extension to rural communities has brought the farmer in daily touch with the world and the markets. Telephone systems that can be easily transported and quickly set up are used in directing the movements of armies on the battle front, and in large cities the telephone fire alarm has displaced the old system. An automatic system of calling telephone numbers that does away with central exchange and its switchboard has been perfected and is rapidly coming into use. It assures privacy in all communications and reduces the expense of operation. Wherever used, the automatic is popular.

For Wireless Telephone see WIRELESS TELEGRAPHY; RADIO.

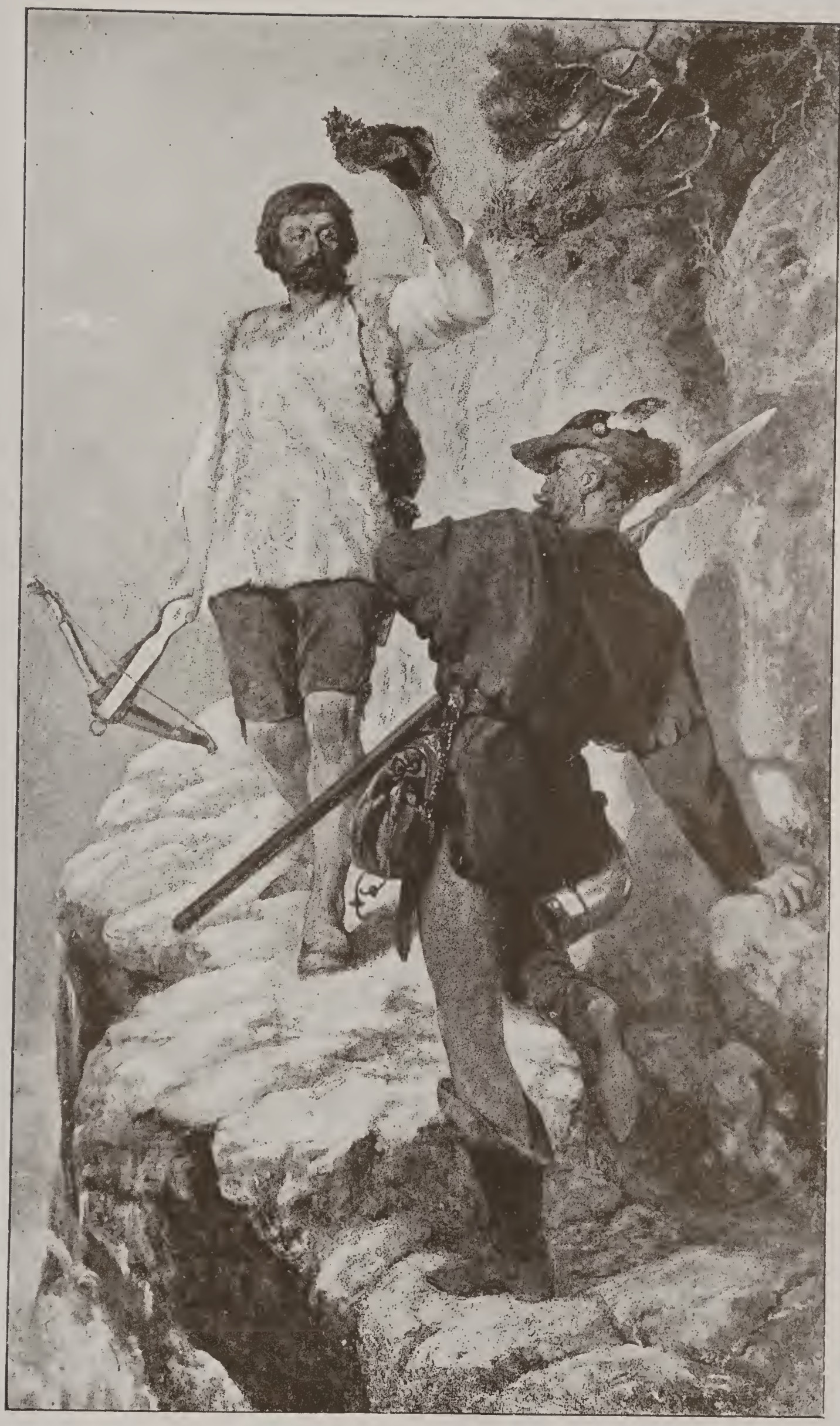
Telescope, an optical instrument. It consists essentially of a tube in which lenses are mounted. The lenses collect the rays of light from a distant object and bring them to a focus in such a way that they seem to proceed from a large object near at hand. The telescope is said, therefore, to magnify objects and bring them nearer.

Telescope is a Greek word, meaning to see afar. The first astronomical telescope was manufactured at Florence by Galileo in 1609. Milton, who visited Galileo in that city, called his instrument the optik tube. Galileo's instrument was a simple refracting telescope. The field glass, the spyglass, and the opera glass are constructed on the same principle. Sir Isaac Newton invented a telescope in which the light travels the length of the tube, falls on a reflecting surface or mirror set at an angle, turns at right angles and passes out through the side of the tube to the eye of the observer. Such an instrument is known as a reflecting telescope; the largest of these is that of the Earl of Rosse. He mounted it at Birr Castle, Parsonstown, Ireland, in 1845. The tube is fifty-four feet in length and is seven feet in diameter.

The largest refractors in America were made at the laboratory of Clark and Sons, Cambridge, Massachusetts. Of these the Yerkes telescope, owned by the University of Chicago, is sixty-five feet long. The aperture of the tube is forty inches in diameter. The telescope of the Lick Observatory, next in size, belonging to the University of California, has an aperture of thirty-six inches and a focal length of fifty-six feet. There are said to be but three firms in the world, one in England, one in Germany and one in France, capable of making suitable glass for lenses.

See GALILEO; MICROSCOPE; ASTRONOMY; LICK; CLARK, ALVAN; LENS; STARS.

Tell, William, a Swiss peasant of the canton of Uri on Lake Lucerne, Switzerland. According to the tradition current, he lived in the early half of the fourteenth century. Gessler, an insolent bailiff, set his hat on a pole and ordered that no villager pass by without baring his head and bowing respectfully. Tell, a famous hunter and bowman, proudly ignored the order. Gessler arrested Tell and condemned him to shoot an apple from the head of his own son, stationed many yards distant. The boy stood unflinching. The shaft flew true. The craven peasantry could not refrain from expressions of relief and joy. As Tell was about to turn away, a second arrow was noted on his person. "For what purpose?" demanded Gessler. "For thy heart in case my son had been harmed," replied the undaunted Tell. Gessler then ordered Tell to be placed in a boat with himself to be conveyed to prison. During the passage of Lake Lucerne a violent storm arose and Tell, who was a skillful boatman, was freed from his bonds to save the boat and its passengers from destruction. Guiding the boat alongside a sheltering rock, Tell sprang ashore before anyone could stop him, and



WILLIAM TELL AND THE BAILIFF
From the Painting by G. Schauer

hastening to a defile through which the party must pass, he awaited Gessler and shot an arrow through his heart.

Tell was instrumental in uniting the four Forest Cantons in opposition to the Austrians, and was an active participant in the battle of Morgarten in 1315, in which 15,000 Austrians were defeated with tremendous loss of life. Tell perished in 1350 while trying to save a drowning man. Although the birthplace of William Tell, the spot where he shot the apple from the head of his son, the rock where he leaped ashore, the defile where Gessler was slain, and the rock in Lake Lucerne where the Swiss conspirators met are all pointed out by popular tradition and are marked by suitable memorials, historians have rejected the Tell story as wholly traditional. Local records give an uninterrupted list of bailiffs, but there is no Gessler. The parish records of births and deaths reveal no William Tell. The historians, or rather chroniclers of the period, do not mention Tell. So far as can be learned his name did not appear in the ballads of the region for a century or two after his supposed death. In a word, documentary evidence is all too recent by centuries to be taken as evidence. Moreover, the story of being given one's freedom as a reward for shooting an apple from the head of a son appears to be widespread among Teutonic people. It is found among the legends of Iceland and Denmark, and in the old English ballads of Adam Bel and Clym of the Clough and William of Cloudesley.

See SCHILLER; LUCERNE.

Tellurium, a chemical element. It has been known since 1782. It occurs in ores of silver, gold, lead, and bismuth. Pure tellurium is a brittle, silvery white metal. It is somewhat more than half as heavy as silver. Chemically it has many of the properties of sulphur, even to the disagreeable odors in combination. The element was discovered originally in Austria, but it abounds in Colorado and other mining regions.

Temperature. See HEAT; THERMOMETER.

Tempering. See ANNEALING.

Tempest, The, a comedy by Shakespeare, presented at court before King James I in 1611 and printed first in 1623. The subject of the play is thought to have been suggested by a pamphlet, *A Discovery of the Bermudas, otherwise called the Isle of Devils.* So far as is known, Shakespeare constructed the plot, which is quite simple. *The Tempest* is one of the shortest of Shakespeare's plays, containing only 2,065 lines. The scene is laid on a small island and the entire action occupies only three or four hours of a single day. The principal characters in the play are Prospero, who represents the Power of Good; Caliban, representing the Power of Evil; Ariel, a sprite; Alonzo, the king; and the fair Miranda. See ARIEL; CALIBAN.

Templars, tĕm′plẽrz, a military order known also as knights templar or knights of the temple. The order was formed in 1118 during the Crusades, and had its headquarters for a time in the temple at Jerusalem. It undertook to protect pilgrims and to defend the Holy Sepulcher. The members wore a white mantle marked with a red cross. The order embraced knights, men-at-arms, and chaplains. It included no little part of the wealth and chivalry of western and southern Europe. Seats were established at Acre, Jerusalem, and Cyprus, and at Paris as well. In its best days the templars did much for the cause of Christendom, but later the order fell into disrepute and was dissolved in 1312 by command of the church.

There is also a rank of Freemasons now known as "The Knights Templars." It is of high standing.

Temple, a structure designed for the worship of a deity or deities. The Mormons of Utah call their great church The Temple. In France Protestant places of worship are called temples by way of distinction from Catholic churches. Bryant says, "The groves were God's first temples." Ordinarily, however, the word temple is apt to call into mind idols and heathen practices. The heathen temple was not a place for the people to worship, but a home and a treasure-house for the divinity worshiped. It was shrouded in mystery and was entered only by the priests. In this respect the Holy of Holies in Solomon's Temple was adapted to ancient forms of worship. It was entered by priests only.

India is noted for cave temples hewn out of the solid rock. Both Brahmin and Buddhist excavated temples of this sort. Their open air temples are of pyramidal form and are known as pagodas. The Egyptians built enormous temples. Lofty solid walls were entered by tremendous gateways. Portions of the interior were roofed with slabs supported on great pillars. Part of the interior area was open to the sky.

The most celebrated temples of antiquity were those of the Greeks. The Greek temple stood usually on a terraced rectangle of marble. The walls were at a sufficient distance from the edges of the terrace to leave a broad walk. A row of massive pillars ran around the edge of the terrace. They screened the walk or porch and supported a heavy entablature, architrave, frieze, and cornice. The whole building was of marble, roofed with slabs. Apertures in the roof admitted light. The most noted Greek temples, if we name but three, were those of Zeus at Olympia, Apollo at Delphi, and the Parthenon of Athena at Athens.

See ARCHITECTURE; THEBES; PARTHENON.

Temple, The. See INNS OF COURT.

Tenacity, the resistance of matter to being pulled apart. SEE COHESION.

Tenements, houses constructed for independent occupation by several families. The building contains what are generally known as single apartments, or flats, and it is found most frequently in the poorer districts of large cities. Within the last half century the construction and care of tenement houses has become a matter of civic control, and great improvement has resulted from the investigation of housing conditions among the poor. Dr. John H. Griscome, the city inspector of the Board of Health in New York City, began the agitation for reform in 1842, and since that time the movement has spread to all the other large cities in the country. The reform includes the following points: Water supply, fire protection, and light and ventilation. Great difficulty has been encountered in enforcing the reform because of the general ignorance among the property holders as to real conditions and real needs. A number of large American cities, and such European cities as London and Berlin have gone deeply into the problem of housing the congregated poor. Large industrial communities presented the greatest difficulties, but the enlightenment both of tenement owners and tenement dwellers has gone far to remove a great evil. One of the most notable American ventures in housing the poor is the model residential city, embodying substantial, sanitary dwellings and delightful surroundings, founded on Long Island by the Russell Sage Foundation. The city of London has expended millions to build model homes for workmen, as have other English cities.

Teneriffe, tĕn-er-ĭf′. See CANARY ISLANDS.

Tennessee, a state of the east south central group, is commonly known as "The Volunteer State." It is bounded on the north by Kentucky and Virginia; on the east by North Carolina, Georgia, Alabama and Mississippi; and on the west by Arkansas and Missouri. The natural western boundary is the Mississippi River. The area is 42,000 square miles.

THE PEOPLE. In 1920 the population of Tennessee was 2,337,885, ranking nineteenth. Only 15,478 inhabitants were foreign born, and the Negro population was about one-fifth of the total. The inhabitants are distributed in the proportion of 56.1 to a square mile and are 26.1 per cent urban. The largest city, Memphis, has a population of 162,351, while Nashville is next with 118,342. Two other cities have more than 50,000 inhabitants each.

SURFACE AND DRAINAGE. The surface is nearly that of a rhombus, 385 miles long and 109 miles wide. The Tennessee River gathers the waters of a part of the western slope of the Appalachian Range and flows southwestward into Alabama, then westward, returning northward through the state on the way to the Ohio. A curve of the Cumberland enters the north central part of the state, affording a second and deeper outlet to the Ohio. There are several well defined physical regions. The Great Smoky and Unaka Mountains, on the eastern border, are a part of the Appalachian Range and have a series of peaks exceeding 6,000 feet in height. Mount

Guyot is 6,636 feet high. The eastern valley of the Tennessee is a continuation of the famous Shenandoah Valley of Virginia. The western valley of the Tennessee is comparatively narrow, ten to fifteen miles in width, and has an altitude of from 300 to 400 feet. Within the great loop of the Tennessee River lies the Cumberland plateau, a tableland 2,000 feet above the sea. The Sequatchie Valley, running northward from the Tennessee Valley into the Cumberland region for sixty miles, is enclosed by rocky walls, 1,000 feet high. Lookout Mountain, on the southern side of the Tennessee near Chattanooga, is an outlying fragment of the same tableland. For a general description of eastern Tennessee, its rivers, mountains, houses, roads, churches, people and occupations, the novels of Charles Egbert Craddock are recommended. West of the Tennessee the surface slopes gently into a belt of rich alluvial land, known locally as the Mississippi Bottoms. This section is tributary commercially to Memphis.

MINERALS. The state is rich in minerals. From two to six seams of soft coal underlie the Cumberland tableland. It is shipped largely in the form of coke for use in the iron furnaces. There are nearly 200 coal mines and over 2,000 coke ovens in this region. There are valuable iron ores in forty-four counties. The chief mines are near Knoxville and Chattanooga and in the highland rim west of Nashville. There are large deposits of phosphate rock in middle Tennessee; zinc is found in workable quantities in east Tennessee, as well as fluorspar, a little gold and an occasional diamond. There is an abundant supply of lithographer's stone, cement, limestone, pottery clay and slate. Tennessee marble has been used freely for the inside casing of the Capitol and library at Washington, and for prominent public buildings elsewhere. Copper is mined to the extent of about 15,000,000 pounds annually.

FORESTS. Originally the entire surface of the state was covered with heavy forests. Nearly every tree native east of the Mississippi is found also in Tennessee. The state survey has described 140 species. The forests are now 13,000,000 acres in extent. The state has never taken a high rank in the production of lumber for shipment, but quite a fleet of small river craft is engaged in gathering up hardwood lumber from local mills—hoop-poles, railroad ties, staves, etc.

AGRICULTURE is the leading industry and about three-fifths of the inhabitants are engaged in farming. The soils are largely clays, resulting from disintegrating limestone. There are rich alluvial soils in the valleys and sandy areas on the Cumberland tableland. Owing to differences in altitude, there is a wide diversity of temperature. Corn is a universal crop and is the mainstay of the farmer. Other crops are more or less localized. Tobacco and winter wheat are important crops northwest and south of Nashville respectively. Cotton, next to corn in money value, is the leading crop in the territory tributary to Memphis. Both Irish and sweet potatoes are raised in large quantities, and peanuts, peaches, plums, apples and pears are raised for shipment. The season is a little later than that of the Gulf states and a little earlier than that of Missouri and the Ohio Valley, thus favoring shipment to the large city markets. As to domestic animals, swine, cattle, sheep, horses and mules rank in the order named. Much of the spare corn is converted into pork.

MANUFACTURE. There were 4,589 manufacturing establishments when the last census was taken. The leading product of these plants is flour and grist, while cotton products, lumber products, dyestuffs, leather, iron and steel, woolen goods, wagons and agricultural implements follow in the order in which they are named. The total manufactured product has an annual value of about $556,253,000. The leading industrial towns are those named in the appended table.

TRANSPORTATION. Tennessee has 4,082 miles of railroads, and the Mississippi, Tennessee and Cumberland rivers afford water transportation. Memphis, Nashville, Chattanooga and Knoxville are ports of entry. The principal railroads are the Nashville, Chattanooga & St. Louis, Louisville & Nashville and Tennessee Central.

INSTITUTIONS. A department of insti-

tutions is in charge of Tennessee's state institutions, which include the Eastern Hospital for the Insane, Western Hospital for the Insane, Central Hospital for the Insane, Tennessee Deaf and Dumb School, Tennessee Reform School, Tennessee Industrial School, Tennessee School for the Blind, Confederate Soldiers' Home, and two penitentiaries.

EDUCATION. Primary education is free and compulsory for white and colored children, for whom separate schools are maintained. In 1922 there were 6,858 public graded schools and 576 high schools. The state maintains three normal schools (one of which is for colored students), the University of Tennessee, and a polytechnic institute. Other institutions (having four year courses) are the Vanderbilt University at Nashville; George Peabody College for Teachers at Nashville; Southwestern Presbyterian University at Memphis; University of the South at Sewanee; Carson and Newman College at Jefferson City; Cumberland University at Lebanon; Lincoln Memorial University at Harrogate; Maryville College at Maryville; Milligan College at Milligan; Tusculum College at Greeneville; Tennessee College at Murfreesboro and Union University at Jackson. For colored students there are five institutions viz., Fisk University at Nashville; Knoxville College at Knoxville, having four year courses, and Lane College at Jackson; Swift Memorial College at Rogersville; and Roger Williams University at Nashville, each having two year courses.

The University of Tennessee, at Knoxville, one of the largest state universities in the South, was founded in 1794 as Blount College; in 1806 it was named East Tennessee University and in 1879 the present name was adopted. The university is organized into colleges of liberal arts, law, medicine, engineering, commerce, agriculture, dentistry, and maintains a summer school and a graduate school. The medical and dental colleges are at Memphis. The student body numbered 2,807 in 1922, and the faculty numbered 226.

GOVERNMENT. Tennessee is governed under the constitution of 1870, the third it has had. This provides for a bi-cameral legislature, the upper house to have 33 and the lower house 99 members.

Executive power is vested in the governor, secretary of state, treasurer, comptroller, and eight other department heads.

The judiciary consists of a supreme court of one chief justice and four associates, court of civil appeals, chancery courts, circuit courts, criminal courts, county courts, courts of justices of the peace and recorder's courts.

HISTORY. The first white settlers entered from North Carolina and Virginia. The first permanent settlements were made on the Watauga and Holston, headwaters of the Tennessee, in 1769-71. During the Revolutionary War, these hardy riflemen took part in the battle of King's Mountain. The region was organized as Washington County of North Carolina in honor of the commander-in-chief of the patriot army. In 1784 the inhabitants became dissatisfied and organized the Independent State of Franklin, with pioneer John Sevier as governor. They relinquished the name and organization four years later. North Carolina ceded the region to the general government in December, 1789 and the deed was executed in February, 1790, and in 1796 it was admitted to the Union, taking the Indian name of the chief river.

The young territory was much harassed by the southern Indians, who were stirred up by the Spaniards. During the War of 1812, 27,833 volunteers came from Tennessee. Tennessee soldiers bore the brunt of the Creek War and of the Seminole War. The government called for 2,800 men in the Mexican War; thirty thousand men responded, gaining for Tennessee the name of "The Volunteer State." O'Hara's famous poem, *The Bivouac of the Dead,* was written in honor of those who fell.

Tennessee seceded May 7, 1861. The eastern section, not in political sympathy with the rest of the state, opposed the act and sent 31,092 men to the Union army. The middle and western sections favored secession, and furnished the Confederacy 115,000 troops. Many of the noted conflicts of the war were fought on Tennessee soil. Grant was driven almost into the river at Shiloh. Murfreesboro, Missionary Ridge, Franklin and Nashville were

COKE OVENS, LAFOLLETTE, TENNESSEE

hard fought engagements. The battle of Lookout Mountain was fought above the clouds. Chickamauga, the bloodiest battlefield in the West, lies close to Tennessee. There were no braver men in the Confederate forces than the Tennessee men fighting desperately for their homes.

STATISTICS. The following are the latest reliable statistics available:

Land area, square miles	41,687
Water area, acres	335
Forest area, acres	13,000,000
Population (1920)	2,337,885
White	1,885,993
Negro	451,758
Foreign born	15,478
Chief Cities:	
Memphis	162,351
Nashville	118,342
Knoxville	77,818
Chattanooga	57,895
Jackson	18,860
Number of counties	95
Members of state senate	33
Members of house of representatives	99
Salary of governor	$4,000
Representatives in Congress	12
Assessed valuation of property	$726,369,281
Bonded indebtedness	$17,988,352
Farm area, acres	19,510,856
Improved land, acres	11,185,302
Corn, bushels	90,713,000
Oats, bushels	5,330,000
Wheat, bushels	4,500,000
Sweet potatoes, bushels	4,400,000
Tobacco, pounds	78,750,000
Cotton, bales (500 lbs.)	340,000
Potatoes, bushels	1,820,000
Hay, tons	1,586,000
Sorghum syrup, gallons	4,032,000
Wool, pounds	2,052,000
Domestic Animals:	
Horses	338,000
Mules	277,000
Milk cows	386,000
Other cattle	570,000
Sheep	526,000
Swine	1,636,000
Manufacturing establishments	4,589
Capital invested	$410,203,443
Operatives	95,167
Raw material used	$344,766,730
Output of manufactures	$556,253,162
Coal, tons	6,000,000
Flour and grist, value	$51,913,000
Copper, pounds	15,629,000
Iron ore, tons	450,000
Pig iron, tons	380,000
Miles of railway	4,082
Teachers in public schools	14,443
Pupils enrolled	621,880

Tennis. See FIVES; LAWN TENNIS.

Tennyson, tĕn′ĭ-sŏn, **Alfred,** an English poet. He was born at Somersby, Lincolnshire, August 6, 1809. He died at Aldworth, near Haslemere, October 6, 1892. His father was a country pastor. Pictures of the old rectory in which Tennyson's childhood was passed show a rambling, comfortable, two-story house surrounded by trees and shrubbery. Alfred was the fourth of twelve children. The family was noted for character, courtesy, intelligence, poetry, and music. Young Alfred was a leader in storytelling, in imaginative games, and in juvenile dramas. He began to write rhymes when he was eight years old. He was a great reader, an admirer of his father's fine library. He was placed in school for a short time under a schoolmaster of the flogging type. It does not appear that young Alfred was treated harshly, yet in later life he wrote, "How I did hate that school!" His father then took charge of his education, undertaking to prepare him for college. In 1826, while still at home, Alfred and a younger brother, Charles, published a thin volume of verse entitled *Poems by Two Brothers.* It contained poems of some merit. Regarded as the effort of two lads, one of whom later became a great poet, it is very interesting.

In 1828 Tennyson entered Trinity College, Cambridge University, where he became one of a group of intellectual young men who formed a most enthusiastic friendship for each other. The central figure was Arthur Henry Hallam.

Keats, Shelley, Byron, and Scott were dead. Wordsworth, Coleridge, Southey, and Moore were resting on their faded laurels. Dickens, Thackeray, Carlyle, and Browning were still unknown. Matthew Arnold was a schoolboy at Rugby. In 1830, urged on by his coterie of friends, Tennyson published a little volume of verse, *Poems, Chiefly Lyrical,* and two years later, another volume, *Poems.* His acquaintances were, of course, loud in his praise, but of the first volume, Christopher North wrote in *Blackwood's* "Drivel and more dismal drivel, and even more dismal drivel," and, in speaking of a particular poem called *The Owl,* he added: "Alfred himself is the greatest owl. All he wants is to be shot, stuffed, and stuck in a glass case to be made immortal in a museum." Tennyson replied with the lines:

You did late review my lays,
  Crusty Christopher;
You did mingle blame and praise,
  Rusty Christopher.
When I learnt from whom it came,
I forgave you all the blame,
  Musty Christopher;
I could not forgive the praise,
  Fusty Christopher.

Lockhart, reviewing the second volume in the *Quarterly,* apologized to Mr. Tennyson for not having seen the first volume, and hailed him in mock adulation as "a new prodigy of genius, another and a brighter star of that galaxy or Milky Way of poetry of which the lamented Keats was the harbinger." Tennyson's friends were partial, his critics were harsh. He profited by both. He kept still for ten years. In the meantime the Reverend Charles Tennyson died and the family removed to a cottage in Epping Forest. Young Alfred left the university, but continued to pursue a literary life. In 1833 Arthur Hallam, his Cambridge friend, the accepted lover of his sister, died in Vienna. The friendship of the two young men was of an unusual nature. Hallam's death cast a sadness over Tennyson's whole life.

In 1842 Tennyson appeared in print again, this time in two small volumes. Among other poems were *Locksley Hall, The Talking Oak,* and *Break, Break, Break.* Tennyson's friends were triumphant; the critics were convinced. Tennyson's poems sprang at once into popularity. The reading public discovered that his older poems, such as *The Lady of Shalott, The May Queen, The Miller's Daughter, The Lotus Eaters,* and *A Dream of Fair Women,* possessed rare beauty.

From this time on Tennyson's literary career ran smoothly. He derived an income from his publisher. He purchased a beautiful residence. In 1850 he married Miss Emily Sellwood. In the same year he was appointed poet laureate to succeed Wordsworth. With abundant means at his command, he purchased a beautiful country-house at Farringford in the Isle of Wight, and later, a home at Aldworth, where he passed his old age. In 1883, at the suggestion of Gladstone, Queen Victoria made Tennyson a member of the House of Lords, giving him the title of Baron of Aldworth and Farringford.

Returning to his poetry, *The Princess,* his chief long poem, appeared in 1847. In this poem he treats the question of woman's place in society, showing that neither man nor woman can afford to be independent of the other. Many of the finest bits of his poetry are imbedded in this poem, illuminating the more sober portions "like flashes of lightning." In 1850 Tennyson published *In Memoriam,* a long poem in commemoration of his friend, Arthur Hallam. Henry Van Dyke, an appreciative student of Tennyson, says "*In Memoriam* is a dead march, but is a march into immortality." The key-note of the poem may be found in the lines,

'Tis better to have loved and lost
  Than never to have loved at all.

Maud, the story in verse of a morbid man, was published in 1855. In 1859 Tennyson began the publication of a series of epics which he called *Idylls of the King.* In these he used the material of the old legend pertaining to King Arthur and his Knights of the Round Table.

As a genius, Tennyson stands a little lower than Shakespeare and Milton. It would be difficult to fix his rank with respect to Chaucer, Spenser, Keats, and Shelley. He is better known than they are; he is more popular than Browning. His is without doubt the greatest name in the era of Queen Victoria. Many critics consider him the third poet who has written in the English language. Without doubt, he combined reason, reverence, and a love of beauty in a rare degree.

Tennyson has been called the poet of science. While Darwin, Tyndall, and Huxley were establishing the doctrine of evolution, and giving the scientific essay a new place in literature, Tennyson was their poetic counterpart. His verses are full of confidence that a better world is evolving out of the old.

Through the ages one increasing purpose runs,
And the thoughts of men are widened with the
  process of the suns.

Tennyson never scoffs. Burns, Byron, Shelley, Keats, Kipling, and other writers of genius lash out at times, but Tennyson is always reverent. Family training and familiarity with the Bible may be traced in word and thought from cover to cover of

his volumes. The oft-repeated statement that the Bible is the fountain source of literature finds abundant illustration in his verses. Biblical allusions and quotations steal through his verse like golden threads in the woof of tapestry. The Queen of Sheba, Lot's wife, and Jonah's gourd appear in *The Princess*. Queen Esther appears in *Enid*. The last line of *The May Queen* is a quotation from Job. Allusions to Eden and to "gardener Adam," to Moses and Mount Sinai, to Ruth, to the Psalmist, to Job, to Bethlehem, and to the crucifixion, are everywhere.

Tennyson has been called a poet of nature. He was fond of the sea. He studied its different moods in storm and calm. He was an admirer of the English landscape, rolling sward, hawthorn hedgerows, and village spires. He was familiar with the birds, brooks, and flowers. Walking with a friend he suddenly fell on his knees in the grass and began to gather and smell, with "Man, get down on your marrow-bones, here are violets." He was a man of quiet, scholarly habits. He never knew the pangs of poverty, but he was not unmindful of the destitution which prevailed among operatives in the manufacturing towns. In all social matters he was true to his early training. His private life was pure. He stood for truth, honor, marriage, home life, and all the sturdy virtues that have made England what it is.

His poems are very unequal in attractiveness. A good third of his poetry consists of drama, little read by anybody. *The May Queen, The Goose, Break, Break, Break, Locksley Hall, Lady Clare, The Beggar Maid, The Eagle, The Brook,* and *The Charge of the Light Brigade,* are the poems with which the young reader should begin. *Sweet and Low* and *The Splendor Falls on Castle Walls* are gems imbedded in *The Princess. Lady Clara Vere de Vere* and *Enoch Arden* should be read next. *The Northern Farmer, The Northern Cobbler,* and *The Village Wife* deal with peasant thought. *In Memoriam* is his greatest single poem. *The Idylls of the King* may be read one at a time as each is complete. They are, however, connected, and the theme of the whole cycle cannot be grasped unless they are read as a single poem.

At the close of his life, Tennyson's remains were laid at rest in the Poets' Corner of Westminster Abbey, near Robert Browning. One of his last poems was *Crossing the Bar.* It is, without comparison, the most exquisite farewell to the world, the greatest swan song, ever written. It was read at his funeral. We have refrained from quoting at length in order to save space for this poem complete:

Sunset and evening star,
And one clear call for me!
And may there be no moaning of the bar,
When I put out to sea.

But such a tide as moving seems asleep,
Too full for sound and foam,
When that which drew from out the boundless deep
Turns again home.

Twilight and evening bell,
And after that the dark!
And may there be no sadness of farewell
When I embark;

For tho' from out our bourne of Time and Place
The flood may bear me far,
I hope to see my Pilot face to face,
When I have crost the bar.

See ARTHUR; ROUND TABLE; IDYLLS OF THE KING.

Tenpins, a parlor game. Ten wooden pins are set up in the form of a triangle in ranks of four, three, two, and one, with the apex toward the player who rolls a ball across the floor with the object of knocking down as many of the pins as possible. To knock down all the pins is "to make a strike." When played in a regularly constructed alley, the game is usually called bowls. See SKITTLES; BOWLING.

Tent, a light habitation or place of shelter. It is composed usually of canvas or skins supported on tent poles and braced by means of cords and tent pins. American readers are apt to think of tents in connection with summer outings, but tents are of great antiquity, and still play an important part in the world. The Hebrew patriarchs from Abraham downward are represented as living in tents. Previous to the building of the temple of Solomon, the Ark was sheltered in a tent.

The Arab sets up three tripods of three poles each, the central one being the higher. Cords are carried from one to the other. The frame thus formed is covered with

large strips of black felt usually made from goats' hair. The tent of a well-to-do Arab is from twenty to forty feet in length, about seven feet high in the middle and five feet high at the sides. A partition through the middle divides the kitchen and the women's quarters from that assigned to the men. When the Arab needs to move with his flocks to new pasturage, the tent is taken down readily and is readily set up. The nomadic people of Central Asia live entirely in tents. Some of these tribes make tent frames of wooden strips like laths. The strips are pegged together so loosely that each section may be closed up diamond-fashion almost like a pole for transportation. When the sections are set up together the whole is covered with heavy felt. The inhabitants of the South Sea Islands are expert in making tents of bamboo poles and large leaves. Tents of bamboo poles and matting are much used in China and Japan. Each tribe of American Indians had its own style of tent. The Sioux had his tepee, the Chippewa his conical tent, and the Iroquois his "long house." Tents constitute an important part of the equipment of all armies, and they are very generally used in the United States by camping parties. Large tents are used for meetings and circuses. Some circus tents will seat over 25,000 spectators.

Tent Caterpillar. The caterpillar or larvæ of certain species of moths. The apple-tree tent caterpillar is the most common and the most destructive. The moths are a dull reddish-brown with two pale oblique stripes on the fore wings. The eggs are laid in July in belt-like clusters around the twigs of apple and wild cherry trees, where they remain until the next spring, when they hatch and the caterpillars weave a tent in the crotch of a branch for a home, hence the name. The caterpillars have ravenous appetites and will soon destroy the foliage of the tree. They go forth to feed in the morning and again in the afternoon. The nests should be destroyed at evening when all the caterpillars are at home. Burning the nests or spraying it with kerosene will kill most of the caterpillars.

Tepee. See TENT.

Teredo, tĕr-ē′dō, or **Shipworm,** a marine shellfish noted for boring, and living in submerged wood and rocks. The common teredo has a long, gelatinous, transparent, cylindrical, worm-like body, with a pair of minute shell-like valves worn on the head. This animated auger follows the grain of the wood. It makes a passage the full length of the timber, turning aside only when it encounters a knot or the body of another teredo. The teredo enters the wood by a hole no larger than a pinhead. As it grows it excavates farther and farther, simply for a home. The sawdust made is expelled by the small entrance through which a stream of sea water is entering and departing. This water passes through the teredo by a U-shaped tube and supplies a diet of microscopic animals and plants. A timber honeycombed by these parallel borings from the size of a knitting needle to half an inch in diameter is a curious sight. Wooden wharves are rendered unsafe and wooden ships are made worthless, it is said, in a single season. Piling may seem sound and yet be unsafe. Copper sheathing is often used to protect woodwork. Painting with creosote is some protection. See BARNACLE.

Terence (195-159 B. C.), a Roman comedian. Terence was the slave of a rich senator, who, seeing talent in the boy, set him free. *The Mother-in-Law, The Self-Tormentor,* and *The Eunuch,* are the translated names of his more prominent plays. He has been compared to the English Congreve, noted rather for wit and sprightliness than for purity of morals.

SAYINGS.

Hence these tears.
I am a man.
Fortune favors the brave.
Many men, many minds.
I did not care one straw.
What a difference there is between a wise person and a fool.

Terhune, Mrs. Mary Virginia Hawes (1831-1922), American novelist and miscellaneous writer, better known by her pen name of Marion Harland. She was born in Amelia County, Virginia, and began to write for the press when only fourteen years old. She was married in 1856 to Edward Payson Terhune. She did editorial work

on *Babyhood, The Homemaker, Saint Nicholas, Wide Awake,* and *North American.* Among her novels are *Alone, The Hidden Path* and *Sunnybank.* The latter is said to have been "the first work to utilize the romantic materials of the Civil War without gross partisanry." Mrs. Terhune was probably best known for her writings on subjects connected with home life and household management. Whenever the problems of cook and housewife came up for discussion, the name of Marion Harland is a recognized authority. *Common Sense in the Household, The Dinner Year-Book, Model Housewife, Breakfast and Luncheon and Tea* are among her published works on household topics.

Termites, tēr′mīts, or **White Ants,** a family of social insects. They are not related to the ant. They are widely distributed, chiefly in the tropics, where they not infrequently build hills ten to twelve feet high and cut underground passages of such extent that animals require to pick their way to avoid a fall. African explorers have reported localities rendered impassable for ox teams. Certain northern species inhabit old logs, stumps, and chambers dug under stones. The termite family consists of a winged king and queen, wingless soldiers with huge heads, and, finally, dirty-white workers who perform the labor of the establishment. They are miners and avoid the light. Except that the kings and queens from numerous colonies swarm forth for a day or two during the pairing season, the life of the entire colony is subterranean. During the breeding season, the queen occupies a chamber hollowed out for her by the workers. She is so swollen with eggs that she lies helpless as a potato. The workers feed her and remove the eggs as fast as they are laid. Florida orange growers have suffered from the underground operations of "white ants" that girdle the trees. These Florida "ants" are said to be working their way northward. They are reported to have reached Illinois. In tropical countries, these "ants" are destructive of woodwork, eating out the interior till the surface crumbles under the touch.

Tern, a family of aquatic birds allied to the gull. The tern is a swift bird and is often called a sea swallow. In flight the bill of the tern points downward; that of the gull straight forward. The tern darts down to the surface of the water, even diving for its food, and regains wing again. The black tern is ten inches long, with head, feet, and under parts black—upper parts slate color, and under part of tail white. It is an inland bird. It breeds from Kansas and Illinois to Alaska. This tern pays no attention to fish, but skims the swamps on tireless wing, taking insects, particularly the dragon fly. The western plowman is followed by a hovering flock of these fearless birds watching for freshly upturned grubs, which they snatch from the furrow at his very heels. This tern nests in sloughs on floating vegetation, and lays two to three grayish, olive-brown eggs. It goes miles from its nest in search of food.

Terpsichore, tērp-sĭk′o-re, in Greek mythology, one of the Muses. She was the inventress and special patron of dancing and lyric poetry. In art she is represented as clad in graceful, flowing robes, frequently seated and carrying a tambourine or else a lyre in her hand. Dancing is sometimes called the Terpsichorean art, and those that are fond of dancing devotees of Terpsichore.

Terra Cotta, a kind of earthenware. The term is applied to building material of a finer quality than ordinary brick, and particularly to unglazed pottery. The vases for which the Greeks were famous were made of terra cotta. Terra cotta pottery is found in the remains of Assyrian and Persian buildings. The vases of Etruria, still recognized as models in art schools, were of this material. The Japanese still excel in making groups, vases, and urns of terra cotta. In architecture, terra cotta is used frequently to mold cornices, water spouts, and other portions to save the expense of carving them out of stone. It is gaining in favor for walls. It expands only half as much as glass. Typical terra cotta is of a pinkish hue. See POTTERY; BRICK.

Terrapin. See TORTOISES, TERRAPINS, and TURTLES.

Terre Haute, tĕr′ē-hōt, a city in Indiana on the Wabash River. True to its name, which means "high land," it is

situated on an elevated plateau, in the midst of a picturesque region. It contains the Indiana State Normal School, Rose Polytechnic Institute, several hospitals and philanthropic institutions, and a public library. Terre Haute is in a rich agricultural and mineral region, and ships large quantities of grain, pork, and coal. The manufactures include foundry products, iron, glass, brick, tile, fencing, artificial stone, liquors, canned goods, flour, etc. The population in 1920 was 66,083.

Territory, in American history, a term applied to certain sections of the national domain having an organized government but not admitted to the Union. The affairs of a territory are administered by a governor, by judges, a marshal, and other officers appointed by the president with the approval of the Senate. Local affairs, including territorial revenue, are managed by the territorial legislature, quite as in a state. A territory is entitled to send a delegate to Congress who has a voice in the consideration of territorial matters but no vote. Territories are formed by special act of Congress. Whenever a territory has sufficient population to entitle it to national representation, Congress may admit it to the Union, provided always that political questions do not present too great an obstacle. The party in power is very reluctant to admit a territory to statehood if the new state is likely to send a delegation to Congress of an opposite political faith. This difficulty has been gotten around in the past by admitting the territories in pairs. With the exception of the original thirteen states, nearly all of the states have passed through the territorial stage. With the admission of Arizona and New Mexico into the sisterhood of states, Alaska and Hawaii will be the only two organized territories of the United States. The unorganized dependencies are Porto Rico, the Philippines, etc.

Terror, Reign of. See FRENCH REVOLUTION.

Terry, Ellen Alicia (1848-), an English actress. She was born at Coventry, her parents being actors, and she made her first appearance on the stage at the age of eight. In 1867 she acted with Henry Irving in the *Taming of the Shrew,* but in the following year she retired from the stage, re-appearing at the end of six years and joining the Bancrofts at the Prince of Wales Theater in 1874. Here she scored her first lasting success in the role of Portia and on December 30, 1878, she first played Ophelia to Henry Irving's Hamlet. Then followed the years of the long partnership between the two actors, and during these years she won for herself an undisputed place as the leading English actress by her notable impersonations of Portia, Ophelia, Viola, Marguerite in *Faust,* and Fair Rosamond in Tennyson's *Becket.* Within recent years she has played in the dramas of Ibsen and Bernard Shaw. Her visits to America met with the most complete success. Her stage jubilee was celebrated in Drury Lane Theater, London, in June, 1906. She has been thrice married. In 1907 she married James Carew, her third husband.

Terry Cloth, a coarse cotton fabric woven with a pile surface. It is used for towels, bathrobes, bathroom rugs, and a variety of domestic purposes. Turkish towels are our most familiar example.

Tertiary Period, in geology, the name of the period immediately following the Mesozoic (or Secondary). At first the Tertiary rocks were not recognized, but were believed to be superficial alluviums. The first Tertiary strata to be understood were those found in 1810 near Paris by French geologists. Others were discovered soon after in England, Italy and elsewhere. However, these different strata were found to be not quite contemporaneous, and they were classed as Lower, Middle and Upper Tertiary until 1833, but later investigations have shown a marked identity.

The period during which the Tertiary strata were deposited has not been definitely determined, but when it began, England was a tropical or sub-tropical country, but became semi-Arctic by the time the newer Pliocene Period was entered upon. During the Tertiary formation there was a great increase in land both in Europe and America.

Tertullian (150-230), a celebrated ecclesiastical writer. He is one of the noted fathers of the church. Tertullian was a native of Carthage, but he was of Roman

descent. He lived at a time when Christianity and paganism were contending for the control of the civilized world. Tertullian was converted to Christianity and lived for a part of the time at Rome. He wrote a number of works, all in Latin. The most noted, perhaps, was a defense of Christianity, being an argument in favor of Christianity *versus* paganism. Other volumes treated of martyrdom, baptism, public games, marriage, patience, taking the veil, etc. Aside from his service to the world in establishing Christianity, the historian values Tertullian's writings for the light they throw on the family and political life of his time.

Tesla, Nicola (1857-), a noted electrical engineer. Tesla was born in Austrian Croatia. He was educated at Gratz, Prague, and Budapest. He was employed for some time by his native government in the department of telegraphy. He went to Paris as electrical engineer for a lighting company, then crossed the Atlantic to the United States, believing this to be a promising field for electrical expansion. For a time Tesla was engaged by the Edison Company. Later he set up a laboratory for himself in New York City. Tesla is noted as an original investigator in electrical fields. He has contributed a number of able articles to the scientific periodicals, and has invented numerous improvements in dynamos, induction coils, arc lamps, incandescent lamps, steam engines, etc. He had a hand in the installation of the machinery used to transmit power from Niagara Falls. Among American electrical engineers Tesla ranks second only to Thomas Edison.

Test Acts, the name applied to various acts of the British Parliament having for their purpose the excluding from office any who were not members of the established church, that is, the Church of England. The term applies particularly to the act of 1661, which required all magistrates to take oaths of allegiance to the crown, acknowledging the king and queen to be the head of the church. The act of 1673 placed the same obligation upon all holders of public office. These acts were repealed in 1829.

Testudo, among the ancient Romans, a defensive cover or screen formed by overlapping shields. The name comes from *testa,* meaning a shell, particularly a tortoise sheel. When a party of Roman soldiers advanced to storm a wall or against the enemy they were wont to close up their files. Each man elevated his oblong shield or target above his head, overlapping it with that of his comrades in such a way that the shields of the company formed a roof or protection against the darts or other missiles of the enemy. Caesar relates that on one occasion the javelins of the enemy hurled through the air fell upon the testudo and pinned the edges of the shields together in such a way that it was difficult for the soldiers to pull their targets apart when they desired to engage the enemy individually. The term was applied also to a movable structure on wheels or rollers used for protecting sappers and miners as they endeavored to undermine a wall.

Tetanus. See LOCKJAW.

Tetrazini, tet-ra-tsé-ne, **Luisa** (1874—), one of the most famous Italian sopranos of her time, was born at Florence. Before twelve years of age, she had learned many operas by hearing her sister sing them. She manifested such remarkable talent that she was given an excellent musical education. Tetrazini made her first public appearance in Florence in 1895. She has sung in grand opera in all the principal cities of the world and ranks among the foremost singers of her time.

Tetzel. See LUTHER.

Texarkana, Ark.-Tex., adjoining cities situated on opposite sides of the boundary line between Arkansas and Texas. The two cities form practically one community. The trunk line railroads entering the city are the St. Louis, Iron Mountain & Southern, the Texas Pacific, Kansas City Southern and the St. Louis & Southwestern. The subsidiary lines are the Transcontinental, and Texas, Shreveport & Natchez, branches of the Texas Pacific system. Texarkana, Arkansas, is the county seat of Miller County. The Texas part of the city lies in Bowie County.

In commercial and manufacturing importance, and because of its geographical

location, the city is of considerable prominence. It has natural gas for industrial and domestic uses from one of the largest fields in the world.

Valuable stands of pine, oak and ash timber are adjacent to the city, and cottton and cotton seed oil and hides are extensively shipped. The industrial establishments include brick and pottery works, cotton compress and cotton seed oil mills, lumber mills; window glass, sewer pipe, sash, door and blind plants; peanut mills; and manufactories of mattresses, sheet metal, caskets, cedar chests, ice, cooperage boxes and crates, handles, floor sweeping compounds, patent medicines, refined petroleum, refined sulphur, creosoted timbers, foundry products, hardwood lumber and other products.

Texarkana is attractively situated in a rich argicultural region, with an abundance of pure water. The city has modern street railway service, and there are miles of paved streets and handsome residences. The public buildings include two Federal courthouses, five banks, a fine postoffice situated on State Line Avenue, serving both cities; several large hotels, three hospitals and fifty churches. The educational institutions include two high schools, one junior high school in a junior high school building, seventeen public schools, six of them for colored pupils. Two business colleges, several private schools and two parochial schools.

The first permanent settlement was made in 1874. Texarkana, Texas, was incorporated in 1875, Texarkana, Arkansas, in 1881. The population of the former city in 1920 was 11,480, of the latter 8,257.

Texas, one of the west south central states of the Union, is commonly known as "The Lone Star State," from the single star in its flag when it was a republic. Texas, with an area of 265,896 square miles, is the largest state in the United States. Its boundaries are formed by New Mexico and Oklahoma on the north; Oklahoma, Louisiana and the Gulf of Mexico on the east; the Gulf of Mexico and Mexico on the south; and Mexico and New Mexico on the west. The Red River divides Oklahoma from Texas on the north; the greater part of the Texas-Louisiana boundary is formed by the Sabine River; and the state is separated from Old Mexico by the Rio Grande River. Texas is roughly 800 miles long by 800 miles wide.

The People. By the fourteenth census Texas had 4,663,228 inhabitants, of whom 741,694 were Negroes and 360,619 were foreign born. Thus this vast extent of territory has fewer inhabitants than has New York City. The density in 1920 was 17.8 to a square mile and the population was 32.4 per cent urban. Of the foreign born, the largest element is Mexican. San Antonio is the largest city, having a population of 161,379 in 1920. Three other cities have in excess of 100,000 inhabitants, and six have between 30,000 and 80,000.

Surface and Drainage. In general, Texas consists of a series of vast plains rising to the west and northwest. The coastal plain of the southeast is low and marshy; at 150 miles inland from the Gulf this plain attains 500 feet above sea level. The western part of the plain is a strip of undulating prairie land known as the Black Prairie, and is one of the richest agricultural regions in the state. In the east central part of the state is another fertile strip of land known as the Grand Prairie. Farther west begins the broad, treeless mesa known as the Great Plains; this rises steadily, attaining 2,000 feet on the western border. Four spurs of the Rocky Mountains cross this plain west of the Pecos River, and Guadalupe Peak, in the extreme southwest, is 9,000 feet high. The northeastern part of Texas is heavily forested with pine, and covered in part with dense growths of magnolia, holly and hawthorn. Along the Gulf Coast are long sandbars or islands, and between these and the coast are long, narrow and shallow lagoons. Padre Island, the largest, is 100 miles long; other large islands are Galveston, Mustang and Matagorda. The principal bays of the coast are Corpus Christi, San Antonio, Matagorda and Galveston, but all are shallow.

All of the rivers flow generally southwestward and empty into the Gulf of Mexico. The Canadian River, crosses the panhandle region and continues into Oklahoma and Arkansas; and the Red River, rising near the New Mexico border, touches

TEXAS

THE LONE STAR STATE

NEW HAMPSHIRE

STATE FLOWER

PENNSYLVANIA

MAINE

SOUTH CAROLINA

R.I.

ILLINOIS

1

2

3

4

5

6.

7.

8

9

1. Cotton
2. Bluebonnet
3. Sugar Cane
4. Gardening
5. Fruit
6. Alfalfa
7. Oats
8. Rice
9. Wheat

Arkansas and drops down into Louisiana. The Sabine rises near the northern border and flows down between Louisiana and Texas, and is met near the Gulf by the Neches. Farther west is the Trinity; and west of the latter is the most important river in the state, the Brazos. The Brazos has a length of about 900 miles and flows through the richest part of the state. The Guadalupe, Colorado, San Antonio, Nueces, Pecos and Rio Grande are the other important streams. There are few lakes in the state, Caddo Lake on the Texas-Louisiana boundary, and Grand, Sabinas and Clear lakes, on the Gulf Coast, being the most important.

MINERALS. The mineral resources of Texas are important, but have never yet been worked to their full capacity. In quantity of output and value of product, petroleum is first; the output in 1921 was 91,927,469, 42-gallon barrels. This valuable fluid and natural gas are found in the eastern half of the state from Oklahoma to the Gulf. Cement, quicksilver, coal, sulphur and salt are produced in varying quantities. In 1921 the output of coal was 938,000 tons. Sulphur is found near the mouth of the Brazos and Colorado rivers at a depth of 1,000 feet; the product averages about 900,000 tons a year. In the north are found salt and gypsum; gold, silver, copper and lead are mined in small quantities in the west; and cinnabar, potash, sandstone, iron, granite, marble and limestone are worked.

AGRICULTURE AND STOCK RAISING are the state's greatest industries. At the last agricultural census Texas had 113,580,716 acres of farm land, of which 32,377,929 were improved. For some years Texas has led the Union in the value of its agricultural products. Of first importance is cotton, which is followed by corn, wheat, peanuts, oats, rice, potatoes, sweet potatoes, hay and sorghum. Vegetables, small fruits, tobacco, rye, barley, kafir corn and pecans add considerably to the total value of farm products.

Texas leads in the number of mules, cattle and sheep; is among the first states in the raising of swine; and in 1921 was fourth as to the number of horses. The broad grassy plains of the west afford rich all-year pasturage for great herds of cattle and sheep. The wild, lean Texas longhorn has been greatly improved upon, and better beef and dairy cattle are raised today than were raised twenty-five years ago. Cattlemen of the old school protested against the sheepmen's coming, but in vain, for Texas now has more sheep than any other state, and the annual wool clip exceeds 15,000,000 pounds.

MANUFACTURE. The last industrial census gave 5,724 as the number of factories in the state, and 107,522 as the number of operatives. Petroleum refining, meat packing and the manufacture of cotton-seed oil and cake are, in that order, the leading industries. Next in importance are flour milling and lumbering. Brick, tile and pottery making, fruit and vegetable canning, sugar refining, molasses making and the cleaning and polishing of rice are other well established Texas industries.

TRANSPORTATION. Texas leads the states with more than 16,000 miles of railroads, and yet there are parts of the state that have no rail transport facilities. Houston is the principal railroad center, having seventeen lines. Two lines cross the state from northeast to southwest and extend into Old Mexico. The most important lines in the state are the Missouri, Kansas & Texas, Texas & Pacific, Galveston, Harrisburg & San Antonio, International & Great Northern, Kansas City, Mexico & Orient, Chicago, Rock Island & Gulf, St. Louis & San Francisco, Atchison, Topeka & Santa Fe, and Houston & Texas Central. The Brazos River is navigable all year for a distance of 40 miles upward from its mouth. The principal ports are Galveston, Port Arthur, Beaumont, Sabine and Houston.

INSTITUTIONS. Texas has made ample provision for the care of dependents and defectives, and the penal institutions are entirely modern. The state exercises control over the state prisons at Huntsville and Rusk; and over the Deaf, Dumb and Blind Institute for Colored Youth, State Epileptic Colony, State School for the Blind, Confederate Home, State Juvenile

Training School, Girls' Training School, State Tuberculosis Sanitarium, State Insane Asylum, North Texas Hospital for the Insane, Southwestern Insane Asylum and State Orphan's Home. There are, of course, many private hospitals and charitable institutions.

EDUCATION. Primary education is free and compulsory for all children from 8 to 14 years of age, and separate schools are provided for white and colored students. In 1920 there were 8,401 elementary public schools, 2,621 public high schools and six normal schools. The state maintains the University of Texas, the State Agricultural and Mechanic College, two junior agricultural colleges, the College of Industrial Arts, and, for colored students, the Prairie View State Normal and Industrial College. Among numerous other higher institutions the following are important: University of Dallas, Daniel Baker College, Southern Methodist University, Texas Women's College, Austin College, Rice Institute, Baylor University, Baylor College, Howard Payne College, Southwestern University and Texas Christian University.

The University of Texas was founded in 1876 at Austin, when a state land grant of 1,000,000 acres was made. A like amount of land was granted in 1883, when the University opened its doors. Courses are offered in arts, law, sciences, education, medicine, engineering and journalism, and extension courses are conducted. In 1922 there were 314 instructors and 4,742 students.

GOVERNMENT. Texas is governed under the constitution of 1876, the fourth it has adopted. This provides for a bi-cameral legislature; the members of the upper house are elected for four years; those of the lower house for two years.

Executive power is vested in the governor, lieutenant-governor, secretary of state, attorney-general, treasurer, comptroller, and commissioner of the general land office. The secretary of state is appointed by the governor, and the other officers are elected for terms of two years.

The legislature is composed of a senate of 31 members and a house of representatives of not more than 150 members. Sessions are held biennially and the governor may call special sessions.

The judiciary consists of a supreme court, courts of criminal and civil appeals, district courts, county courts, commissioners' courts and courts of justices of the peace.

HISTORY. The Spaniards who conquered Mexico were the first to explore the land now called Texas. Coronado and De Soto were the first explorers; a mission was established by Espejo at El Paso in 1582; and upon the basis of their explorations the Spanish laid claim to a large sweep of territory north of the Rio Grande. The French explorer La Salle founded a colony on Matagorda Bay in 1685, and thereafter from 1712 to 1803 Texas was alternately in the possession of Spain and France. When the United States made the Louisiana Purchase in 1803 the Rio Grande was considered the southern boundary, but in 1819 the Sabinas was made the southern line.

When Mexico threw off the Spanish yoke, 1821 (See MEXICO, subtitle *History*), Texas became a Mexican province. In 1822 Stephen A. Austin led a large band of Americans into Texas for the purpose of colonization. The Americans in Texas had become so numerous by 1830 that Mexico forbade further immigration and began a systematic campaign of persecution against the Americans. The latter armed themselves for battle, and on March 2, 1836, declared the province an independent republic. Four days later the Battle of the Alamo was fought. (See ALAMO.) On April 21, the Mexicans under Santa Anna were decisively beaten at San Jacinto by a small force of Americans under General Sam Houston, and the independent government of Texas was set up with Houston as president.

In 1845, following a lengthy dispute over the slavery question, Texas was admitted to the Union. A controversy over the southern boundary caused a second war with Mexico in 1846, but in 1848 the Rio Grande was definitely fixed as the southern boundary.

Texas joined the Confederacy in the

Planting Tobacco in East Texas

400-Acre Peach Orchard near Jacksonville

Loading Sheep in Southern Texas

Crating Onions for Market Near Laredo

SOME TEXAS INDUSTRIES

Civil War. In 1866 a new constitution was adopted, but because of the slavery clause it was not accepted by Congress; a new constitution was adopted in 1869 and in 1870 the state was readmitted. Thereafter the progress of Texas was rapid.

STATISTICS. The following are the latest reliable statistics available:

Land area, square miles	262,398
Water area, square miles	3,498
Irrigated area, acres	586,120
Forest area, acres	12,400,000
Population (1920)	4,663,228
White	3,918,165
Negro	741,694
Indian	2,109
Foreign born	360,519
Asiatic	1,260
Chief Cities:	
San Antonio	161,379
Dallas	158,976
Houston	138,276
Fort Worth	106,482
El Paso	77,560
Galveston	44,259
Beaumont	40,422
Wichita Falls	40,079
Waco	38,500
Number of counties	253
Members of state senate	31
Members of house of representatives	150
Salary of governor	$4,000
Representatives in Congress	20
Assessed valuation of property	$3,367,347,912
Bonded indebtedness	$4 022 000
Farm area, acres	113,580,716
Improved land, acres	32,377,929
Corn, bushels	156,920 000
Oats, bushels	33 570 000
Wheat, bushels	20 810,000
Sweet potatoes, bushels	8,200 000
Rice, bushels	5,596.000
Potatoes, bushels	2 072,000
Peanuts, pounds	123 825 000
Cotton, bales (500 lbs.)	2,200.000
Sorghum syrup, gallons	3,045 000
Wool, pounds	17,600,000
Domestic Animals:	
Horses	1,187 000
Mules	792,000
Milk cows	1.184.000
Other cattle	4,547,000
Sheep	3,069,000
Swine	2,427.000
Manufacturing establishments	5 724
Capital invested	$585,776,451
Operatives	107.522
Raw material used	701 170 898
Output of manufactures	999.995.796
Lumber products, value	$47 884 000
Petroleum, barrels (42 gals.)	91,927.469
Sulphur, tons	900.000
Cement, barrels	2,228,000
Coal, tons	938,000
Miles of railway	16,049
Teachers in public schools	30,358
Pupils enrolled	1,035,648

Thackeray, William Makepeace (1811-1863), an English novelist and satirist. He possessed also considerable artistic talent, illustrating his own works with original drawings. Thackeray was of good family. He was born in Calcutta, but was sent home in childhood to escape the heat of India and to be educated in London at the Charter House School. He was a rather timid boy, sensitive to the rough manners of his mates, and the lack of sympathy on the part of his masters. He once wrote his mother that there were 370 boys in the school, adding, "I wish there were only 369." Later, in *Mr. and Mrs. Frank Berry,* he referred to the school as the "Slaughter House." At the age of eighteen he went to Cambridge, but remained in the university only one year. He showed no marked ability in his studies, but was a great reader, took a prominent part in a literary society, and was connected with a periodical published by the undergraduates entitled *The Snob.*

Thackeray left college to travel on the continent. He visited Paris and other European cities. Returning to London, he engaged in the study of law, but soon gave it up and went again to Paris to become, as he hoped, an artist. The conviction that he had not the talent to make a great artist forced itself upon the young man at about the same time that he realized that he must make his own way financially,—his fortune having been lost partly in an Indian bank and partly by unwise investments.

Thackeray's early writing was published in *Fraser's Magazine, Punch,* and periodicals of like character. These articles were signed by various pseudonyms, as George Fitz-Boodle, Ikey Solomons, and Michael-angelo Titmarsh, the latter in humorous allusion to his having once aspired to be a great artist. *The Great Hoggarty Diamond,* exposing the method by which bubble companies impose upon the innocent and inexperienced; *The Book of Snobs,* satirizing snobbery in all classes of society; *The Memoirs of Yellowplush,* being a footman's experiences; *Fitzboodle's Confes-*

sions; Men's Wives; Barry Lyndon, the memoirs of a villain and sharper; *Novels by Eminent Hands,* in which the peculiarities of Bulwer, Disraeli, Cooper, and other novelists are caricatured—these and many others, all satirizing the mistakes, the failings, the sins of mankind, were among his earlier productions.

Vanity Fair appeared in 1848. It is Thackeray's masterpiece and made him at once famous. He warns his readers that he is about to tell a "tale of harrowing villainy." The story has no hero. The heroine is Becky Sharp, an unprincipled young woman, the shrewdest and most unscrupulous adventuress in literature. *Pendennis, Henry Esmond, The Newcomes,* and *The Virginians,* appeared during the next dozen years, and comprise the great novels of Thackeray. As his previous work would lead us to expect, the vices and follies of fashionable life are exposed with keen wit and stinging satire.

In *Henry Esmond,* a historical novel of Queen Anne's time, the author leaves the dashing style and praises the hero of the story for unselfishness and manly actions. It has been said that "no historical novel carries one so completely into the spirit of the age" in which its scenes are laid. It was not, however, as well received as the others. Taine says of it, "Thackeray has not written a less popular nor a more beautiful story." The popularity of *Henry Esmond* has increased. It has been always a favorite in this country.

In 1851 Thackeray began giving public lectures. *The English Humorists of the Eighteenth Century* and *The Four Georges* were subjects of lecture courses delivered with success in England and America. Steele, Addison, Swift, Pope, and Goldsmith are among the writers taken under discussion in *English Humorists.* He writes of the men themselves, rather than of their books, and with pleasing wit and much sympathy gives us vivid pictures of their varied personalities. *The Four Georges* are sketches in a mildly satiric vein of these four monarchs, their households, and the social life of their respective reigns. Both series of lectures make delightful reading.

In 1857 Thackeray established *The Cornhill Magazine.* Of the first number, more than 100,000 copies were sold. *The Roundabout Papers* are the most interesting of Thackeray's own contributions to this periodical. They are playful and amiable essays, containing a little autobiography and a good deal of moralizing brightened with touches of imagination.

Thackeray is a master of pure, simple, finished English prose. Although often quaint and sometimes even colloquial, it is always direct, easy, graceful. He does not excel in the invention of episode and incident, nor does he present pictures which make us happy and in love with life. His chief characteristics are a power of observation, of seeing beneath the surface, keen analysis and delineation of character, sharp wit and a use of invective in which he has few superiors. In his satire, it must be admitted that he is too earthy, too abusive, too coarse; but it must be remembered that his object is to make vulgarity, hypocrisy, and immorality hateful. In the conclusion to *Catherine,* a story which is perhaps more unpleasant than any other he has written, he states that he feels the greatest disgust for the characters he describes and has used his "humble endeavor to cause the public also to hate them."

It has been said that Thackeray's novels show a hatred of humanity and a disbelief in goodness. A study of the man's character will show such a judgment to be without foundation. His life proves him to have been a kindly, honest-hearted man, full of noble impulses and large sympathy, compassionate and tender, superior to all small jealousies and spitefulness. He hated with a deadly hatred all sham and villainy, all humbug and pretentiousness. Not even Dickens himself had a greater reverence for humanity, for the home and family, for love and kindness and charity. The difference between the two men is not so much one of character as it is of attitude, of point of view. Dickens goes among the humble and lowly and finds there purity and nobility of character. Thackeray goes to the high and mighty and finds weakness and vanity, falsehood and villainy. Dickens exalts the true and noble that he may inspire in us a love of virtue. Thackeray abases the false and ignoble and would inspire a hatred

for vice and hypocrisy. Both aim to better mankind. Dickens' method is a pleasanter one. Hence he is more popular. We may believe that his method is more efficacious, but Thackeray had his own work to do and he did it well. To be true to himself he must fulfill his mission, not like a Dickens, but like a Thackeray.

QUOTATIONS.

Such people there are living and flourishing in the world—Faithless, Hopeless, Charityless; let us have at them, dear friends, with might and main. Some there are, and very successful, too, mere quacks and fools; and it was to combat and expose such as these, no doubt, that laughter was made.

Perhaps of all the novel-spinners now extant the present speaker is the most addicted to preaching.

The humorous writer professes to awaken and direct your love, your pity, your kindness—your scorn for untruth, pretension, imposture, — your tenderness for the weak, the poor, the oppressed, the unhappy.

TRIBUTES.

Only the shallow and undiscriminating reader fails to see that Thackeray's seriousness is deeper and more vital than his cynicism; that though the smile of the man of the world is on his lips, few hearts are more gentle, more compassionate, more tender; that though he is quick to scorn, few eyes have looked out on this unintelligible world through more kindly or more honest tears. Satirist as he is, he kneels with the genuine and wholesouled devotion of Chaucer, of Shakespeare, and of Milton, before the simple might of innocence and of goodness.—Pancoast.

In all the characteristics of his genius, Thackeray is thoroughly English, and the faults and follies he chastises are those especially characteristic of British society. Good sense and the perception of the ridiculous are amalgamated in him; his satire is a thoroughly British article, a little over-solid, a little wanting in finish, but honest, weighty, and durable. Posterity will go to him for the humors of the age of Victoria, as they go to Addison for those of Anne's.—*Britannica.*

In Thackeray's later writings, the dark shades no longer preponderate. The mellowing influence of years and sickness and clamor, as well as more extensive observation of life, had sunk the merciless satirist in the genial humorist and philosophic observer. He had still ample scorn for falsehood and vice, and satire for folly and pretence; but he had also smiles and tears, and tenderness and charity, that gave a moral beauty and interest to the last decade of his brilliant career as an author. —*Chambers.*

Thales, thā′lēz (about 640-546 B. C.), a learned Greek. He is known as one of the seven wise men of Greece. He was the first of the Ionian natural philosophers. He considered water the basis of all things, the universal principle of nature. He established the length of the year at 365 days. He predicted an eclipse of the sun for May 28, 585 B. C. He is considered the originator of several geometrical theorems. He discovered the truth that each angle inscribed in a semicircle is a right angle. This he regarded so important a mathematical truth that it is said he sacrificed an ox to the immortal gods. He is also said to have computed the height of an Egyptian pyramid by thrusting a stick into the ground. The shadow of this stick and the height of his stick, and the shadow of the pyramid, gave him three terms of a proportion, whereby he found the fourth term, namely the desired height of the pyramid. See EUCLID.

Thalia, thā-lī′ä, in Greek mythology, the muse of comedy. She was called at an earlier period the Joyful Muse, for she was supposed to inspire gaiety and rural pleasures. She presided at banquets where music and song accompanied the festivities. Later she became the muse of comedy. She was the mother, by Apollo, of the Corybantes, priests of Cybele, who worshiped that goddess with dancing, to the accompaniment of drum and cymbal. Thalia is represented in art crowned with ivy. She carries a shepherd's crook and has a comic mask in one hand. See MUSES.

Thallium, a metallic element akin to lead and zinc. It was discovered in 1861 by Sir William Crookes in the lead chambers of sulphuric acid works in the Harz Mountains. He detected its presence by a brilliant green line shown in the spectroscope. The name is Greek, signifying a green twig. Before dross is formed on the surface, thallium presents a silvery white luster. It is softer than lead and, like it, is malleable. It melts readily. Its chief use in the arts is in the making of glass. A trace of thallium in the lens of a microscope increases its magnifying power. Thallium is also used to add luster in the manufacture of glass jewelry.

Thames, tĕmz, the chief river of Great Britain. Although but 217 miles in length, 180 miles are navigable. It is a drowned river. Its mouth is an estuary of the North Sea twenty-seven miles in width. The

largest ships ascend as far as London Bridge. The tide ascends as far as Oxford. It rises and falls at London through a height of ten or fifteen feet. The upper part of the river has been connected by extensive canals with the Severn and with central England. The Thames is the most frequented, the busiest river, in the world. The lower part of the river would be more attractive were it not a common sewer for all London. See OXFORD; LONDON; LONDON BRIDGE.

Thanet, Octave. See FRENCH, ALICE.

Thanksgiving Day, in the United States a day set apart on which to give thanks for the blessings of the year. It was suggested, no doubt, by the English Harvest Home, an old-fashioned festival held to celebrate the completion of harvest. A similar festival in Scotland was known as Mell Supper.

The first American Thanksgiving Day was observed by Plymouth Colony November 26, 1621. The observance of the day became general throughout New England. After the Revolutionary War the usage spread to the Middle States and over the West, making progress more slowly southward. The governors of most states issue Thanksgiving proclamations. Since Lincoln set the example in 1863 successive presidents have issued proclamations. By common consent the last Thursday in November is the date set. Business is suspended customarily. Union services are held in some church. Family reunions are held. The traditional articles without which a Thanksgiving dinner is incomplete are roast turkey, cranberry sauce, and pumpkin pie. After dinner coasting and skating are in order, but a religious feeling pervades the day. A Thanksgiving dance, for instance, seems out of keeping. The colonies of Americans resident in the various cities of the Old World usually hold reunions on Thanksgiving Day.

The original Plymouth Thanksgiving was held under peculiar circumstances. After the first corn crop had been gathered, Governor Bradford and the Pilgrim Fathers decided to have a feast of ingathering,—a day of thanksgiving. They invited the friendly Massasoit to join them. He and his braves, ninety strong, came with venison and wild turkeys. The surrounding woods yielded the housewives wild fruit, and the waters supplied fish and clams. No room or home in the colony was large enough. The children gathered wood; fires were built out-of-doors. The housewives united their efforts. They boiled, and baked pastries, corn-bread, and puddings in kettles. Wild turkeys, geese, ducks, and venison were hung on poles and roasted over open beds of coals. Clam chowder was made hissing hot for the first course. Tables were set under the pine trees. What was lacking by way of plates was made up by wooden trenchers. If they did not have silver spoons, they had wooden ones. There were knives enough. All sorts counted, and forks they did without. The children ate by themselves or waited for second table. What with preaching, feasting, talking, and games, the exercises lasted three days. Fifty-five English-speaking people were present. Sickness had told heavily on the colony. Over forty of their band lay under the sod. Of the fifty-five mentioned there were but four women. These, with the young girls and one servant, prepared for all that large company and the ninety Indians besides.

See HOLIDAYS.

Thaxter, Celia (1835-1894), an American writer of poems and stories. Celia Laighton was born at Portsmouth, New Hampshire, in 1835. Her father, disappointed in some ambition, left Portsmouth to become the keeper of a lighthouse on one of the Isles of Shoals, ten miles off the coast. He vowed never to set foot on the mainland again and kept his word, though the family moved once, to another lighthouse on Appledore, a larger island. Celia was five years old when they left the mainland, and tells of their isolated winter life. "Into the deep window seats we climbed, and with pennies (for which we had no other use) made round holes in the thick frost, breathing on them until they were warm, and peeped out at the bright, fierce, windy weather, watching the vessels scudding over the intensely dark blue sea all 'feather white.'" Celia lived a life almost as free as that of a seabird. Her father taught her to understand books and nature. The shore, waves, seashells, screaming seabirds,

tempests, and passing ships were her companions.

In the height of summer, boarders came to Appledore for a few weeks, and, when she was only sixteen, a Mr. Levi L. Thaxter, a young lawyer of Watertown, Massachusetts, carried her off as Mrs. Thaxter. In Boston Mrs. Thaxter was introduced to musical and literary people. In 1861 she wrote a poem of longing for her old island home on an old envelope for a friend. It found its way into the hands of Lowell, then editor of the *Atlantic,* who christened the lines "*Landlocked*" and published them, greatly to Mrs. Thaxter's surprise. From this time Celia Thaxter was led on—Whittier sending word "Write,—thee must—it is thy Kismet"—to contribute many tales and poems. Her prose books are *Among the Isles of Shoals* and *An Island Garden.* Celia Thaxter's writings show that genius writes well on familiar subjects. Among her characteristic poems are *The Burgomaster Gull, Milking, The Great White Owl, The Kingfisher,* and especially *The Sandpiper.* We give the second stanza of the last named:

Above our heads the sullen clouds
  Scud black and swift across the sky;
Like silent ghosts in misty shrouds
  Stand out the white lighthouses high,
Almost as far as eye can reach
  I see the close-reefed vessels fly,
As fast we flit along the beach,—
  One little sandpiper and I.

Mrs. Thaxter made her winter home in Portland. She spent the rest of the year at Appledore, which became a delightful summer meeting place of the leading literary and artistic people of New England. Mrs. Thaxter died at Appledore, August 26, 1894, leaving a name and an influence in American literature distinctly her own.

Theater, or **Theatre,** thē′a-tēr, a playhouse, a building devoted to dramatic representations. Theater is from a Greek word meaning to see, to view. The Greek theater was an outdoor affair, capable of seating from 10,000 to 40,000 people. Rising seats were cut like steps in a semicircle on the side of a hill. The seats in such an audience room could neither be broken nor set on fire. The spectators sat with their backs to the hill. The stage for the accommodation of the players was built at the foot of the hill in line with the diameter of the circle. This stage was roofed, but it was open in front. An incense altar stood in a semicircular space between the stage and the audience. The Greek chorus of fifteen members, in the *Electra,* a company of maidens, in the *Ajax,* a crew of sailors, and in the *Antigone,* a group of aged Thebans, came in with stately step, passed around the altar, and sang their part at proper intervals. The actors declaimed from the stage, of course. Female characters were represented by boys. Women were not allowed to act. The first actresses were seen on the French and English stage during the seventeenth century. At the conclusion of a play, the audience left the theater by aisles that divided the auditorium into wedge-shaped sections. In a large theater a circular aisle ran around about midway as well. An open-air theater, reproducing the Grecian plan, has been built at Berkeley, by a wealthy friend, for the University of California.

The Roman theater was an imitation of the Grecian. The seats were carried around to form two-thirds of a circle, giving rise to the term amphitheater. Not infrequently they rested on masonry instead of on a hillside. A circle of arches rose around the rear by way of an inclosure. In case of an artificial amphitheater, tunnels, called vomitories, ran outward at the lower levels. The audience room was open to the sky. The stage was roofed. It was in line with a frontal chord rather than a diameter.

The earliest of modern theaters were built in Venice, Paris, and London. The first theater in America was built at Williamsburg, Virginia, in 1752. The largest and finest theater in the world is the Grand Opera of Paris. For the stage of Shakespeare, the reader is referred to GLOBE THEATER. The auditorium of modern theaters is constructed usually on the semicircular plan. Galleries rise in tiers around the outer wall. Nomenclature varies. The center of the house is known usually as the dress circle; the portion under the galleries, the parquet; the galleries are numbered from one, the lowest, upward. Private compartments are known as boxes. Lamps in a semicircumference, running

around the front edge of the stage, usually in a sunken channel out of sight of the audience, are called footlights. The stage is provided with grooves in which to slide scenes and pulleys for curtains. A fair amount of landscape scenery is considered part of the furniture of standard theaters. Traveling troupes carry special scenery with them.

As a preventive of disaster, in case of fire or stampede, the laws of most countries prescribe strict rules for the construction of theaters. The doors must open outward. Regulations fix the number and width of aisles in proportion to the number of sittings. It is forbidden to obstruct the aisles with chairs.

In many countries and cities theaters are regarded as educational, and, like schools, are granted state or royal aid. Tickets of admission are expected to defray only a small part of the expense. There are theaters supported in whole or in part at public expense in Budapest, Prague, Munich, Brussels, Antwerp, Copenhagen, Stockholm, Paris, Berlin, Weimar, Dresden, Athens, Mannheim, Lisbon, St. Petersburg, Moscow, Madrid, and in the cities of South America and Mexico generally.

In 1920 there were more than 3,000 theaters in the United States that booked dramatic productions. New York had the largest number, Chicago standing second and Philadelphia and Boston holding third and fourth places respectively. In the same year there were 28,361 professional actors—15,124 male, 13,237 female. Since the advent of the moving picture (which see), a new class of actors has originated, and the number of moving picture theaters has greatly swelled the total of America's places of amusement. American theater receipts run well into the hundreds of millions of dollars annually.

Thebes, thēbz, the name given by the Greeks to an ancient city of Egypt. It was situated on both shores of the Nile, near the southern end of Egypt proper. Karnak and Luxor are suburbs on the eastern shore. The valley is narrow and is hemmed in by lofty cliffs. Thebes was for centuries the residence of the pharaohs. Though now in ruins, the home of wretched villagers, 2000 B. C. it was the capital of the world, capable of sending out 20,000 war chariots. The city was so wealthy that Cambyses, the great Persian conqueror, secured treasure to the value of $10,000,000. Even yet "Thebes, in spite of the ravages of time and of the barbarians, still presents the grandest, the most prodigious assemblage of buildings ever erected by the hand of man." Homer called the city the Hundred-Gated, having reference to the huge stone gateways to the temples, for the city required no walls. Thebes was a city of splendor and power before Rome was even a name.

The largest of the ruins is a temple of Ammon, known as the temple of Karnak. A row of stone sphinxes—silent, inscrutable—leads to the main entrance. The gateway or pylon is 360 feet—a city block—in width, and 142 feet high. There are courts within courts and acres of stone roof supported by forests of stone columns. The roof of one hall rests on 134 columns, from forty to seventy feet high and from nine to twelve feet in diameter. The effect is said to fill the spectator with awe.

Other temples in the vicinity are hardly less notable. The entrances and walls are decorated with sculpture in low relief, portraying the warlike achievements of the pharaohs. Chariots, battle scenes, sieges, secretaries counting the heads of the slain, and triumphal processions are among the scenes. The work is said to be far superior to that found in the ruins of Assyria and Babylonia. A remarkable statue is that of Rameses II. It is forty feet high and represents the king sitting on his throne. It is cut from a single block of red granite, weighing not less than 887 tons. It came evidently from the quarry of Syene, many miles distant. How it was transported, no one can imagine. Another remarkable work of sculpture is a pair of statues of Memnon, forty-seven feet high. Each is made out of a single stone. One is the celebrated vocal Memnon. In the cliffs are the tombs of the kings. The entrances are adorned with gateways, colossal figures, sculpture, and hieroglyphics. The chambers within are extensive and artistic, and are adorned with inscriptions, paintings, and sculpture. Some of the finest tombs of alabaster have been removed to the British Museum. Other antiquities

have found their way to museums in Paris, Berlin, and other capitals of Europe. It is to be regretted that the Arabs have done much damage to the figures as hostile to true religion, and that Christian relic hunters have encouraged their guides to chip and break off mementos.

See MEMNON; ARCHITECTURE; TEMPLE; EGYPT.

Thebes, a city of Greece. It was situated on a plateau in Bœotia, north of Athens. It was surrounded by a wall having seven strongly fortified gates. According to tradition, it was founded by Phoenicians under Cadmus, the same who sowed dragon's teeth and raised men, and who first brought the alphabet to Greece. Thebes was the reputed birthplace of Bacchus and Hercules. At certain periods, the Thebans played an important part in the history of Greece. During the Persian wars the city fell into disrepute by making its peace with the Persian monarchs. In the Peloponnesian War Thebes sided with the Spartans against Athens. The most celebrated Theban was Epaminondas, under whose leadership the city acquired a supremacy over Athens and Sparta, which came to an end, however, with the battle of Mantinea, 362 B. C. Philip and his son Alexander reduced the city to utter subjection, destroying its walls and illtreating the inhabitants. The Thebans appeared for the last time in history during the war between the Romans and Mithridates. The city chose the losing side of the controversy and was destroyed by the Romans. The ancient site is now occupied by a village of possibly 3,000 inhabitants. See OEDIPUS; EPAMINONDAS; PINDAR.

Theine. See CAFFEINE.

Theism, belief in the existence of deity, that is, belief in a god or gods who rule the universe. In a narrower sense, the word is used sometimes as synonymous with monotheism, that is, the belief in one god. The word is also applied to the doctrine which assumes a living relation to exist between God and man.

For the purposes of this article the first definition is the one demanding attention. In this sense the word is generic, including all forms of pantheism, polytheism, and monotheism. Theism, thus considered, is coextensive with religion, the acts by which men acknowledge their belief in deity; and rite worship, acts of reverence offered to deity. Theism is opposed to atheism. The word atheism meant to the ancient Greeks simply a disbelief in the Greek gods, and was thus applied to the early Christians. It has come to mean the denial of the existence of God. Polytheism, one form of theism, is the belief in many gods. The great nations of antiquity, the Greeks, Romans, Egyptians, Assyrians, and Babylonians were all polytheists. Even among the ancient Hebrews polytheism existed as may be gathered from Joshua xxiv: 2, and from II Kings xvii: 16. Pantheism is the theory that the finite world is an aspect or part of the one absolute eternal Being of whom all finite existence is but a manifestation. Pantheism borders on mysticism, which may be defined as that phase of thought or feeling in which reliance is placed upon spiritual enlightenment, transcending sense perception and ordinary human experience. The philosophical system most clearly expressing pantheism is that of Spinoza, but it would seem that pantheism has almost as many interpretations as it has individual disciples, some defining it as God in nature, others declaring that those who so define it worship nature. Monotheism is the belief in one god only. All the varying forms of the Christian religion, as well as the religion of the Hebrews, and of such other sects or individuals as deny the divinity of Jesus Christ, but believe in one supreme God, are monotheistic. Deism is a form of monotheism, also, the deist believing in a personal god, but denying the revelation of the Scriptures, regarding them from a purely rationalistic point of view.

Another term that may be defined in this connection is agnosticism, the theory that it is impossible to know anything about the nature of God or even that there is a god. This doctrine was formulated by Huxley to make clear his position as opposed to atheism which denies the existence of God. The words heretic, infidel, and skeptic are often used carelessly. Their meanings are quite distinct. A heretic is one who holds to some doctrine not accepted by his church. An infidel is a dis-

believer in the accepted religion, although he may believe most profoundly in some other religion. Thus Mohammedans call Christians infidels. A skeptic is simply a doubter.

Themistocles, thē-mĭs′tọ-kleez, a noted Athenian leader. He died about 460 B. C. He rose to prominence immediately after the battle of Marathon. He strove to equal the fame of Miltiades, whose victory robbed him of sleep. He was one who, though he "knew nothing of music and song, did know how of a small city to make a great one." He foresaw that the Persians would renew their attack and urged his fellow citizens to devote the revenue derived from recently opened gold mines and from tributary cities to the building of the most powerful fleet in the world. From the oracle of Delphi he procured a response that the safety of the city lay in wooden walls. Alcibiades the Just, who opposed him violently, he caused to be ostracized or exiled for a term of years. The return of the Persians and the naval battles of Salamis, in which the fleet of Xerxes was routed, proved the wisdom of his plans. After the retirement of the Persians Themistocles was by far the most influential man in Athens. He pursued a vigorous policy. He rebuilt the walls of Athens, fortified the Piraeus, and made it the busiest port in the world. The rest of his life is less pleasing. He was suspected of collecting tribute and of neglecting to turn it into the city treasury. He was accused of taking bribes and of aiming to make himself tyrant of the city. He was ostracized and fled first to Argos, then to Corcyra, and finally to the court of Xerxes at Susa. He was received cordially and made governor of a province in Asia Minor. Here he lived in luxury. Three cities were assigned the duty of providing him bread, wine, and meat respectively. The manner of his death is unknown. His bones, so runs the tradition, were carried secretly to Attica and buried in his native soil. A spot at the neck of the harbor of Piraeus is known as the Tomb of Themistocles. See SALAMIS; ARISTIDES; ATHENS.

Theocritus, thē-ŏk′rĭ-tŭs, a Greek bucolic poet of the third century B. C. He was born either at Syracuse or at Cos. Thirty-one pastoral and idyllic poems are ascribed to Theocritus, although the authorship of several is doubtful. Many of these idyls are dramatic in form and consist of conversations between herdsmen and shepherds. Virgil imitated Theocritus in his *Eclogues*. A bit of translation from his *Thalysia* and a word from Edmund Clarence Stedman will serve to give an idea of this poet:

The red cicadas ceaselessly amid
The shady boughs were chirping; from afar
The tree-frog in the briars chanted shrill;
The crest-larks and the thistle-finches sang,
The turtledove was plaining; tawny bees
Were hovering round the fountain. All things near
Smelt of the ripened summer, all things smelt
Of fruit-time. Pears were rolling at our feet,
And apples for the taking; to the ground
The plum-tree staggered, burdened with its fruit;
And we, meanwhile, brushed from a wine-jar's mouth
The pitch four years unbroken.

Theocritus created his own school, with no models except those obtainable from the popular mimes and catches of his own region; just as Burns, availing himself of the simple Scottish ballads, lifted the poetry of Scotland to an eminent and winsome individuality.

See ECLOGUE; IDYL; PASTORAL.

Theodoric the Great (454-526), king of the Ostrogoths. He received his education at Constantinople while held as a hostage by the Emperor Leo. After succeeding his father as a king of the Ostrogoths he made war on Odoacer, ruler of Italy, and, having subdued him, established the seat of his power at Ravenna. He quartered his soldiers in Italy, giving them one-third of the agricultural land. He was a ruler of ability. He maintained peace throughout a vast domain and governed the Italians in accordance with their own, that is to say, Roman law. Much to his credit, he gave strict orders that the monuments of art at Rome be protected. He even set aside certain revenues to be devoted to their restoration. He was himself a Christian, holding to the Arian faith, but he lived on terms of amity with his Roman Catholic neighbors. He deserves mention in history, not only as a just and powerful ruler, but as the greatest man among the Goths. It was his boast that "the only regret of the Italian people should be that the Goths had not come at an earlier period." His palace and tomb are still stand-

ing at Ravenna. There is a tradition that Theodoric was so illiterate that, instead of using a pen to sign documents, he had a gold plate through which letters were cut. This being placed on a piece of paper, the king traced his signature with a quill. See GOTHS; RAVENNA.

Theosophy, the name given to a form of religious belief promulgated by Madame Blavatsky, a Russian, whose book *The Secret Doctrine* is the authoritative work on modern theosophy. The word theosophy means wisdom concerning God, and is meant to convey the idea that this "wisdom" is received intuitively. Madame Blavatsky spent much time in India studying the occult sciences of the East. Theosophists believe God to be infinite and absolute. They claim that spirit and matter are two aspects of one "root-nature." According to the immutable law of things the "spirit involves into matter and the matter evolves the spirit." The application of this law in the sphere of psychic life leads to perpetual re-incarnation. The doctrine gained many disciples in various parts of the world, and is still winning adherents.

After Madame Blavatsky's death the society she organized was directed for a time by Mrs. Annie Besant in England and by Mr. Judge in New York. Disagreements arose and various independent societies were organized. The American Society came under the control of Mrs. Katherine Tingley in 1898. She has conducted two theosophical crusades around the world, and has established a sort of theosophical colony at Point Loma, California. Mrs. Tingley has been instrumental in establishing relief work for Indian famine sufferers, for wounded soldiers, and for orphan children. She is the owner of Isis Theater, San Diego, California, and is the editor of *Century Path* published at Point Loma.

Thermometer, an instrument for the measurement of temperature or degree of heat. It was invented by Galileo some time prior to 1611. It is founded on the principle that substances expand with heat and contract with cold, that is to say, with a loss of heat. The expanding substance used as a measure may be a liquid, as mercury or alcohol, or it may be a gas, as in the air thermometer, or even a metal.

A thermometer in common use is the mercurial thermometer or, in exceedingly cold regions, the alcohol or spirit thermometer which does not freeze up so readily. In either case the liquid is expanded by heat and is poured into a glass tube with a large bulb at its lower end. While the liquid is still hot the tube is sealed to prevent the entrance of air. The colder the temperature, the less the bulk of the mercury or alcohol, and the lower the column stands in the tube. With increasing heat the liquid swells, and the column rises higher.

Several systems of marking the thermometer are in use. According to the Fahrenheit system, the temperature of chipped ice and salt is marked 0° F.; that of boiling water is 212° F.; the intervening space is divided into 212 degrees. Water freezes at 32° F. At one time, the temperature of ice and salt was supposed to be that of the greatest attainable degree of cold. Still lower temperatures are said to be below zero. Thus, —32° F. is 64 degrees colder than freezing water at 32° F.

According to the centigrade system the zero point may be found by placing the thermometer in freezing water. A lower temperature is marked below zero. The point at which the mercury stands when placed in boiling water is marked 100° C. The intervening distance is divided into 100 degrees. Thus we say that 0° C. and 100° C. correspond to 32° F. and 212° F. A degree Fahrenheit is $\frac{1}{180}$ of the difference between the freezing and the boiling temperatures for water. A degree centigrade is $\frac{1}{100}$ of the same difference. A degree centigrade is therefore equal to $\frac{180}{100}$ or $\frac{9}{5}$ of a degree Fahrenheit.

By reason of its convenient notation and natural zero point, the centigrade thermometer is gaining in popularity and will no doubt become universal.

See HEAT; MERCURY; MUIR.

Thermopylae, ther-mŏp′i-lē, a narrow pass on the eastern coast of Greece. The mountains leave a pass between themselves and the sea so narrow that two carts can hardly pass on firm ground. The name signifies the hot gates. It is derived from a

number of hot springs that burst out at the foot of the cliff. Xerxes, the successor of Darius, whose forces were routed at Marathon, invaded Greece again in 480 B. C., this time by way of the Hellespont and Thrace. The Athenians were shamefully deserted before the battle of Marathon, but the Spartans now took the lead in opposing Xerxes. They mustered a force of allies at the famous pass, where the cliffs protected their left and a Greek fleet, largely Athenian, kept their right wing. For three days the battle raged. A storm destroyed 400 Persian ships and Xerxes could not win the pass. Finally a traitor led a force of the enemy through an obscure path over the mountains; the Spartan leader, Leonidas, now gave his allies leave to retire. He, with a Spartan band of 300, held the pass. Xerxes called upon the Spartans to give up their arms. "Come and take them," was the reply. "The Persians are so numerous that the flight of their arrows and javelins will throw a shadow like a cloud," said one. "Then we will fight in the shade," was the reply. Leonidas and his band supported by 700 Thespians held the Persians at bay for a time, but were finally overpowered by numbers and were slain to a man. The bodies of the 300 were buried where they fell. A memorial inscription ran thus, "Stranger, go tell at Sparta that we lie here in obedience to her command."

Theseum, a noted temple of Athens. It was built in Doric style of Pentelic marble. It still stands in Athens at the foot of the Acropolis although the sculpture has suffered much from the ravages of time and at the hand of man. The Theseum is yet regarded as the most perfect surviving example of the Greek temple. It ranks next to the Parthenon in beauty.

Theseus, thē′sūs or thē′sē-ŭs, in Greek legend, the national hero of Attica. He was a son of Aegeus, king of Athens, and Aethra, a princess of Troezen. Aegeus was obliged to leave Aethra before the birth of the child. He placed his sword and sandals beneath a large stone and charged Aethra that, when their son should be strong enough to roll the stone away, she should send him to his father. When the mother thought the time had come, she led Theseus to the stone which he moved without difficulty. The youth then chose that road to his father which he knew to be beset with the greatest difficulties. On the way he fought and slew a son of Hephaestus, who was in the habit of terrifying and attacking travelers. He also killed Procrustes, the "Stretcher." Procrustes had an iron bedstead to which he fitted every person whom he could persuade to lodge with him. If the guest was too short for the bed he was stretched; if he was too long, a piece was chopped off. Several other evildoers were met by Theseus and disposed of before he reached Athens. Medea, the sorceress, who had fled from her husband Jason to Athens, had now married Aegeus and, at once recognizing Theseus, she tried to poison him, but his father recognized the sword he carried and his life was saved. Theseus met with many adventures. The most notable was slaying the Minotaur. The Athenians were forced each year to send seven youths and seven maidens as a tribute to Minos, king of Crete. These were devoured by the terrible Minotaur. Theseus offered himself as one of the victims and set off with the other thirteen in a ship with black sails. Theseus promised his father to return with white sails if he was successful. With the aid of Ariadne, daughter of Minos, he slew the Minotaur, saving his companions. Then taking Ariadne with him, he started to return to Athens. Directed by Minerva, Theseus left Ariadne asleep on the Island of Naxos and went on without her. Perhaps this little episode distracted his mind, for he forgot to change his sails. His father, seeing the ship returning with black sails, believed his son was slain and took his own life. Theseus now became king of Athens. One of the famous episodes of Theseus' career was a war with the Amazons. He carried off their queen and they pursued him into the very heart of the city where he finally overthrew them. This battle was a favorite subject with sculptors. After many adventures and exciting experiences, Theseus at last lost favor with his people and retired to Scyros, where he was slain. Theseus is a semi-historical character. It is supposed that he united the several tribes of Attica into one state, but it is impossible to separate fact from legend

in an account of his life. See MINOTAUR; ARIADNE; PIRITHOUS; MINOS.

Thespis, a Greek author of the sixth century B. C. He was a native of Attica and is regarded as the inventor of tragedy, as he introduced the rhapsode with his recitation at the feasts of Bacchus in the intervals between the performances of the chorus. This was the beginning of dialogue and the drama. See RHAPSODE; TRAGEDY.

Thessalonians, Epistles to the, letters of Saint Paul. The first epistle to the Thessalonians, which is the earliest known letter of St. Paul, was written at Corinth, probably some time in the years 53-54 A. D., and within a year and a half of the founding of the Church at Thessalonica. This church was composed of a little band of converts to Christianity, these including a number of Jews. The Jews of the city, however, became so hostile and vindictive, that the missionaries, although feeling that they were needed and that the church was not firmly established, thought that it would be best to leave the field. Paul became anxious about the fate of the little church, and sent Timothy to Thessalonica to strengthen the members in their faith and comfort them, and also to enable Timothy to see how matters stood and communicate this to Paul. Accordingly, Timothy went to Thessalonica, and returned to Corinth with a promising report for the future of the Church at Thessalonica. Unable to be present in person, which was his wish, Paul sent what is known as the first epistle to the Thessalonians. It is composed of two parts, the first being for the greater part explanatory and personal, the second being ethical and doctrinal, warning the Thessalonians against commercial greed, impurity, and pious idleness, in view of what they believed to be the imminent coming of the Christ on earth for the second time.

The second epistle consists of three parts, the first introductory, the second dealing with the supposition that the coming of the Lord was at hand, and the third being exhortative, repeating the warnings of I Thessalonians.

Thessaly, thĕs′a-lĭ, in ancient history, a region lying between northern Greece and Macedonia. It is surrounded by mountains. It consists practically of a single river basin about sixty miles in diameter which discharges its waters through the famous Vale of Tempe between Mounts Olympus and Ossa into the Aegean Sea. The land was fertile and, for Greece, comparatively level. The inhabitants were of mixed Greek and Macedonian descent. They reared a famous race of horses. They furnished Greeks, Macedonians, and Persians with contingents of cavalry. Thessaly lay in the route of Xerxes' invading army. The final engagement between the troops of Pompey and Julius Caesar was fought out on the plain of Pharsalia, August 9, 48 B. C. The district was held long by the Turks. It is now a part of the modern kingdom of Greece. See MACEDONIA.

Thetford Mines, Quebec, in the center of the richest asbestos mining district in the world, is on the Quebec Central Railroad, 76 miles south of Quebec City. The asbestos mines are the only reason for the city's importance, though there are manufactories of foundry products, cement building blocks, lumber and sash and doors.

Thetford Mines is electrically lighted and has good schools, churches and a park. In 1921 the residents numbered 7,886; most of them are engaged in mining.

Thetis. See ACHILLES.

Thibet. See TIBET.

Thiers, te-êr′, **Louis Adolphe** (1797-1877), a distinguished French statesman and historian. His father was a locksmith of Marseilles. The young Louis was educated for the law but took to literature. In 1821 we find him in Paris contributing literary and political articles to the newspapers. His politics were liberal in cast. In 1823-27 he wrote a ten-volume *History of the French Revolution.* It became immensely popular. Carlyle, who had himself written a history of this period, and who thought Thiers had not gone to the bottom of the matter, said of him, "Thiers is a brisk man in his way and will tell you much if you know nothing," and again, "The history is as far as possible from meriting its high reputation." A twenty-volume continuation Thiers termed *A History of the First Consulate and the Empire.* On the downfall of Napoleon III in 1871, Thiers was made the head executive of the new French Republic and was later elected president.

It fell to his part to negotiate the treaty of peace with the Germans. He went to Versailles to meet King William of Prussia. Tears poured down his face, because he could not induce Bismarck to forego Alsace-Lorraine, even at the offer of a fabulous ransom. Thiers is recognized universally as a man of gifts, statesmanship, and patriotism. See ALSACE-LORRAINE; VERSAILLES; FRANCO-PRUSSIAN WAR; NAPOLEON III.

Thimble, a device for pushing the needle through without injury to the hand. The word is a perversion of thumb-bell. The German name is finger-hat. The Swedish name is finger-fort. The thimble was used first by the sailmaker. The English sailmaker still wears his thimble on his thumb, and calls it a thummel. The tailor wears his thimble usually on the end of the middle finger of the right hand. In the making, the metal—brass, steel, or silver — is rolled into thin sheets and cut into strips two inches wide. From these strips, round blanks the size of a silver quarter or half dollar, according to the size of the desired thimble, are cut. The blanks are fed to a machine that turns up the narrow rim found at the edge of the thimble. The blank, still flat, is next fed into a mill. A stamp, that is to say, a round-ended plunger, presses the flat metal into a hole and the finger-hat is shaped. Another machine impresses the dents designed to hold the head of the needle. Polishing and engraving or stamping in patterns are later processes. Silver requires to be hardened by the admixture of other metal. Gold thimbles are steel at heart, gilded with gold alloy. Thimbles are made sometimes of hardened India rubber or celluloid. The date of the lady's thimble is unknown. It was used certainly in the time of the English Stuarts.

Thinking, consciousness of relationships. No one is able to say how soon a child may begin to think. All perceiving involves consciousness of relationship or meaning. Hence it is safe to say that thinking begins with perceiving. But such thinking involves little or no formal expression. It is implicit rather than explicit, and is therefore overlooked by most of those who are trying to detect the "dawn of thought."

The acquisition of language facilitates the expression of thought and renders the thinking more and more formal until the adult finds himself unable to think without words or other symbols. By means of language the baby's dim consciousness of relationship becomes the man's clearly expressed thought. It is only through language and other symbols that thought may be interchanged. Helen Keller had many thoughts which she vainly tried to express before she learned to use any symbols. She was conscious of relationships; she was thinking. As soon as she learned symbols her thinking became explicit.

The verbal results of thinking may be summed up in one word, in one sentence, or in a group of sentences, one of which is a conclusion to which the other sentences in the group bear some relation. Thinking which results in a concept is often summed up in one word. Children are constantly naming objects and processes in a manner which indicates that they have been comparing, abstracting, and generalizing. Most words which have meaning in one's consciousness represent a long train of comparison, abstraction, and generalization. An attempt to define a word tends to make the mind more aware of these phases of conceptional thinking. The attempt at definition will be fairly successful, provided proper experience preceded the use of the word in question. A common mistake in teaching is to demand definition before rather than after experiences have been supplied for comparison, abstraction, and generalization.

If thinking is stated in a sentence, that result is called a judgment. But many other judgments may have been made before the one expressed was reached. Judging has sometimes been called the "yes" and "no" consciousness. This is because ideas are weighed, as it were, and something is affirmed or denied of their relation to each other. In order to express thought in the form of judgments the thinker must have (1) clear concepts, (2) power of attention to grasp more than one idea at a time, (3) means of expression. Too many times children have been forced to make judgments involving concepts not yet clear to them. Such training gives rise to the parrot-like talk sometimes heard in school recitations. Sometimes children have judgments for

which they have no means of expression. This is one reason for making a study of manual work and artistic achievement.

If all the judgments relating to a conclusion are expressed, the thinking may be designated explicit *reasoning*. Very little of a mind's reasoning is ever fully expressed; when it is, the expression is likely to appear formal and stilted, as does any complete syllogism.

As a matter of fact most thinking is very much "telescoped," and this is particularly true of that thinking which is called deductive reasoning. This kind of reasoning is usually defined as "passing from the general to the particular." As a matter of fact the "general" and the "particular" are merely relatively so. Any conclusion already accepted may be used as the major premise in deductive reasoning. Many conclusions so used have been gained by the thought process called *inductive* reasoning.

Inductive reasoning gives a group of sentences related to a conclusion more general in application than any other judgment in the group. A child observes the nesting habits of one pair of robins. He may think of their mud-lined nest, the location of it in the large low branches of the tree. A little later he sees another robin's nest. He thinks of its mud lining; its location in the lower branches of the tree. After a third or fourth experience of that kind he concludes: "All robins line nests with mud and build in the large, low branches of trees." If such a thinker should write out or otherwise express all his observations, as well as the conclusion, the thinking so expressed would constitute a fine example of explicit inductive reasoning. The great weakness lies in the fact that most thinkers are impatient to reach conclusions and make only a few particular judgments. They look at one nest and then declare the rule for all. All inductive reasoning needs to be more scientific. The scientific method in inductive reasoning makes a large number of particular judgments before any final conclusion is accepted. Charles Darwin made tens of thousands of separate judgments before he formulated his conclusion concerning the origin of species. His reasoning was scientific.

Thirst, the craving in man or animal for water, similar to appetite, the desire for food. Though the seat of the sensation seems to be in the mouth and throat, the want is not satisfied unless the water is swallowed and absorbed. Introduction of water into the system other than through the mouth allays thirst. Thirst is an accompaniment of certain fevers and is provoked by certain substances such as salt. For allaying thirst, nothing is better than pure cool water swallowed slowly. Sweet drinks are to be avoided. Some fruits, notably the citrous, lessen the desire for water. The body can survive longer without solid food than without water.

Thirty-Nine Articles. See ARTICLES, THE THIRTY-NINE.

Thirty Years' War, The, a religious and political war in central Europe, 1618-1648. It broke out between the Protestants and Catholics in Bohemia and soon involved all Germany. The German emperor and Spain took the part of the Catholics or southern Germany. Sweden and Denmark took the part of the northern or Protestant princes. France, a Catholic country, under the lead of Richelieu was so influenced by jealousy of the German emperor as to take the Protestant side. Tilly and Wallenstein were the most noted leaders of the Catholic forces; Gustavus Adolphus, the most noted Protestant commander. Condé and Turenne led the French forces. The war was concluded by the peace of Westphalia in 1648. The outside parties, that is to say, Sweden and France, were gainers by the war. The war was in every way disastrous to Germany. Fertile and populous districts were reduced to uninhabited wastes. The destruction of life and property was so great that Germany was set back for a century. See WALLENSTEIN; GUSTAVUS; RICHELIEU; WESTPHALIA, PEACE OF.

Thistle, thĭsl, a common name given to a large group of plants of the composite family. They are allied closely to the burdock. They are characterized by spiny leaves and bracts. The bracts of the head form an acorn-like cup. The flowers are usually purple and some are of great beauty. Growing as they often do in standing grain, thistles are very troublesome weeds. The worst is the Canadian thistle. The more it is plowed up and persecuted, the

more it seems to spread. The only way to exterminate it is to get it entirely out of the ground, for each fragment left behind produces a new plant. The thistle is the national flower of Scotland.

Thomas, George Henry (1816-1870), a noted American general. He was born in Virginia. He was graduated at West Point in 1840. He saw service in the Seminole War and in the war with Mexico. From 1851 to 1854 he was an instructor at West Point. He entered the Civil War a colonel and came out a major-general. He won the victory of Mill Springs, and led the Union center at the battle of Murfreesboro. He defended the Union position at Chickamauga, September 19, 1863, with such pertinacity that he was dubbed the "Rock of Chickamauga." He was commander-in-chief at the battle of Chattanooga. When Sherman set out on his march to the sea, he left Thomas to oppose Hood. A short campaign resulted in the total defeat of the latter at Nashville. His last command was the department of the Pacific. He died at San Francisco. See CHICKAMAUGA, etc.

Thomas, Theodore (1835-1905), a distinguished German-American orchestral leader. He was a native of Hanover. He came to New York in 1845. He accompanied Jenny Lind on her first American tour. In 1878 the music-loving Germans of Cincinnati made him director of the College of Music. He was conductor of the Brooklyn Philharmonic Society for several years. In 1891 he established the famous Thomas Orchestra of Chicago. A recital hall was built for him in 1904 at a cost of three quarters of a million dollars, but Conductor Thomas did not live long to enjoy his triumph. The name of Theodore Thomas ranks high in the history of orchestral music.

Thompson, Benjamin. See RUMFORD, COUNT.

Thompson, David (1770-1857), a Canadian explorer who, like Hearne, Mackenzie and others, did much to open up to settlement vast tracts of fertile country. Thompson was born at London, England, and studied for a time at Oxford; but at the age of nineteen he removed to America and entered the services of the Hudson's Bay Company. He explored in the Great Lakes region, discovered one of the sources of the Mississippi River—Turtle Lake—in 1798; and in 1807-11 engaged in the work of exploration west of the Rocky Mountains. During the latter period he followed the Columbia River from its source to its mouth and acquired much exact information regarding this stream. Thompson worked on the Canada-United States boundary survey from 1816 to 1826, and was later with other surveying and exploring expeditions in western Canada.

Thompson, Denman (1833-1911), an American actor, creator of the humorous New England character, *Josh Whitcomb,* and author of the very successful comedy, *The Old Homestead.* Mr. Thompson was born in Erie County, Pa., but spent most of his boyhood in Swanzey, N. H. There he studied the types that he afterwards reproduced with such success. At the age of 17, he joined a circus as an acrobat. Returning home after a year, he found that business could not hold him, and in 1852 he made his stage debut at Lowell, Mass. After an uneventful theatrical tour of the United States, Canada and England, Mr. Thompson attracted attention with his *Joshua Whitcomb,* a sketch that he wrote in 1875. It portrayed the peculiarities of the old-fashioned New England farmer, and was so well received that it was enlarged into a play and produced in Chicago. In 1887, Mr. Thompson again enlarged and revised the story, renaming it *The Old Homestead.* It was given in almost every state in the Union, with Mr. Thompson in the leading role, and since 1887 it has been given almost every season. Another successful play by this talented actor is *The Sunshine of Paradise Alley.*

Thompson, tŏm′son, **James Maurice** (1844-1901), an American writer. He was a native of Fairfield, Indiana, but was educated in Georgia. He served in the Confederate army during the Civil War. Although he practiced civil engineering and law at Crawfordsville, Indiana, he was first of all an enthusiastic naturalist. From 1885 to 1889 he was state geologist of Indiana. He cruised the swamp region of the South Atlantic coast with canoe, bow, and arrow. He disliked the noise of a gun and the dismay it caused among wild ani-

mals. One of his earliest books is entitled *The Witchery of Archery;* another *Byways and Bird Notes;* and still another, *The Boys' Book of Sports.* Of several excellent tales, the most noted and the one on which his fame will rest ultimately is *Alice of Old Vincennes,* an interesting and well told tale of the French outpost.

Thompson, Sir John Sparrow David (1844-1894), a Canadian jurist and statesman, was born at Halifax, Nova Scotia, and received a common school education. He studied law and in 1865 was admitted to the bar. He took an active interest in politics while still a young man, and in 1877 was elected to the Nova Scotia assembly. He was made provincial attorney-general in 1878, and premier of the province in 1882. The latter office he resigned in a few weeks to accept the office of chief justice of the supreme court of Nova Scotia.

Again in 1885 Sir John appeared on the political field and was elected to the Dominion House of Commons, at the same time securing the position of Minister of Justice. He was legal adviser to the British delegates to the Fisheries Conference between Great Britain and the United States in 1887, and soon thereafter was knighted. Sir John was made Dominion Premier in 1892, and in 1893 was one of the arbitrators of the Behring Sea Controversy. He was largely responsible for the Canadian criminal code, both in conception, principles and detail.

Thomson, Jameś (1700-1748), a British author. He was a native of Scotland and was educated at Edinburgh for the ministry. He soon gave up his profession, however, to devote himself to literature. His first poem, *Winter,* was published in 1726. A year later *Summer* appeared, then *Spring;* and finally, in 1730, *The Seasons,* Thomson's most noted work, was complete. *The Castle of Indolence,* published in 1748, is well known also. *The Seasons* is of special interest as marking a decided change in the fashion of English poetry. To an age when poetry meant the artificial verse of Pope, or the brilliant satire of Dryden, or the burlesque of Butler, or even the lofty rendering of classic lines—meant in fact all that is remote from everyday life — *The Seasons*, dealing directly and simply with that which is close at hand, came as a surprise and charmed by its very novelty. Thomson, in his "fresh treatment of a simple theme," not only hit upon something new, but he taught those who came after him to "meditate the book of Nature, ever open," as is evidenced by Cowper and Gray, and, above all, by Wordsworth.

Thomson, Joseph John (1856-), an English physicist. He was born in Manchester and received his education in Owens College, and in Trinity College, Cambridge. Since 1884 he has been professor of experimental physics in Cambridge. He has been successful in attempts to split the hydrogen atom, and the small part removed whose mass is about one-thousandth of that of the atom itself, he calls a corpuscle, or with its electrical charge, an electron. Professor Thomson is a leader in the physics of the electron. He wrote the following scientific treatises: *Application of Dynamics to Physics and Chemistry, Recent Researches in Electricity and Magnetism, Elements of the Mathematical Theory of Electricity and Magnetism,* and *Conduction of Electricity Through Gases.*

Thomson, Sir William, Lord Kelvin (1824-1907), an English physicist and mathematician. He was born in Belfast, Ireland, was educated in the Universities of Glasgow and Cambridge, and became professor of natural philosophy in the University of Glasgow in 1846, filling that position for fifty-three years. He was knighted in 1866, served as president of the Royal Society from 1890 to 1895, and was raised to the peerage in 1892. He visited the United States three times, the last being in 1902.

Baron Kelvin ranked high as an inventor. He perfected the mariner's compass, introduced the siphon recorder used in connection with submarine cables, invented the quadrant and portable electrometers, and the mirror galvanometer for submarine telegraphy. He was electrician for the company that laid an Atlantic cable in 1857, and its success in 1866 was to a great extent due to his constructive skill and inventive genius.

In addition to these varied activities, he has contributed several scientific treatises. Among these are: *Papers on Electro-*

statics and Magnetism, Mathematical and Physical Papers; also, in collaboration with Professor Tait, *A Treatise on Natural Philosophy.* Lord Kelvin received many distinctions during his lifetime, and is honored by burial in Westminster Abbey. It has been said that he shares with Helmholtz the name of the greatest physicist of the nineteenth century.

Thor, in Scandinavian mythology, the thunderer. He was the son of Odin and Jörd, Earth, and, among the gods, was next in importance to his father. Thor was the friend of gods and men. When the gods were in difficulty they called on Thor, and when trolls and evil spirits played tricks on mankind Thor was the one to whom mortals looked for deliverance. Thor's hammer was named Mjölnir, the Smasher. When he had hurled it, it would fly back to his hand of its own accord. He had a girdle which doubled his strength whenever he put it on. He possessed also four goats, Crack, Crash, Grind, and Chase. Thialfi, the swift runner, was his servant.

Many stories are told of Thor. One of the most interesting is of his journey with the mischievous Loki through the giant's country. This occurred while Thor was still young and knew little of giants. It was on this expedition that they slept all night in the mitten of Skrymir, mistaking it for an enormous cave. In the morning Skrymir came along, hunting his mitten. He was a friendly fellow and they traveled in company, though the gods had hard work to keep up with the giant's long legs. When they parted Skrymir directed Thor to the city of Utgard. Here they met the giant king, Utgard-Loki. He challenged the gods to enter contests with his men. So Loki tried an eating match with Logi, each beginning at one end of a wooden trough filled with meat. When Loki had eaten the meat to the middle of the trough, he looked up and found that his rival had eaten meat and bones and trough besides. Thialfi tried a running race with Hugi. Hugi ran to the goal, and returning, met Thialfi soon after he started.

Thor thought he would like to try a drinking match. Utgard-Loki had a horn of mead brought, which he said the most puny drinker would empty in three draughts. But when Thor had drunk three times—and he was very thirsty and long of breath—he had only lowered the liquid a little in the horn, so that it "might be carried without spilling." Thor was somewhat abashed, but offered to try some test of strength. "Well, then, lift my cat," said the king, "a child could do that." Thor tried his best, but could only get one of the cat's feet off the floor. Thor was pretty well roused by this time and offered to wrestle. "Nobody here would wrestle with a little fellow like you," said Utgard-Loki, "unless it be my old nurse Elli." So Thor wrestled with Elli, who brought him to his knees in short order. Thor went to bed much chagrined. In the morning, when he and his companions were about to take leave, Utgard-Loki accompanied them to the gate of the city and there confessed to Thor that he had made use of illusions. He said: "You saw your Loki eat with Logi. Logi is in reality Fire. Hugi is Thought, and is, of course, swifter than your fleet Thialfi. As for you, know that one end of the drinking horn was in the sea, which you caused to sink by your marvelous drinking. What I called my cat is the Mitgard serpent, which encircles the earth. You so stretched him that his head and tail could scarcely meet. Elli, with whom you wrestled, is Old Age, who will sometime lay low both gods and men." Then Utgard-Loki disappeared and when Thor in anger turned to reënter the city and avenge himself for the tricks played on him, he saw no city at all, only a green plain.

Thor is represented as a man in the prime of life, with a long red beard. Sacrifices were offered to him beneath oak trees. Thursday, the fifth day of the week, is named for him. In *Tales of a Wayside Inn,* Longfellow has a poem entitled *The Challenge of Thor.* It begins:

> I am the God Thor,
> I am the War God,
> I am the Thunderer!
> Here in my Northland,
> My fastness and fortress,
> Reign I forever!

Thoreau, thō′rō, **Henry David** (1817-1862), a New England naturalist. He was born at Concord, Massachusetts, July 12, 1817, and died there May 6, 1862. His

father was of Huguenot descent, a man of character, a skillful pencil maker. Thoreau was graduated at Harvard in 1837. He declined his diploma on the ground that it was not worth the customary fee of five dollars. He taught a few terms of school at Concord and Staten Island, New York, but found the business irksome, and settled down at Concord. He worked in a desultory way at surveying, carpentering, and making pencils. He was a skillful mechanic and he could seize an even dozen of pencils unerringly, but he had a theory that one should work as little as possible, and live the rest of his time. He was an odd genius. Emerson, his literary patron and companion on many a ramble, said of him, "He was bred to no profession. He was never married. He lived alone. He never went to church; he never voted. He refused to pay a tax to the state. He ate no flesh; he drank no wine. He never knew the use of tobacco, and, though a naturalist, he used neither trap nor gun."

In some respects, Thoreau appears to have had a mulish disposition. His friends tried, as they thought, to make something of him, but he resisted at every step. He protested against fine houses, rich clothing, rich food, and expensive habits, maintaining with a grim sort of obstinacy that the business of life was to live, not to make a living. He was a man of simple tastes and hardy habits. It cost him no effort to do without what others considered the comforts of life. He chose to be rich by making his wants few. Freedom, time to think, leisure to ramble through the woods, to sit on a log, to watch the birds, insects, animals, and fishes, to study the flowers, and to jot down his observations in notebooks, were the things he liked.

In 1845 he squatted in a pine grove on the shore of Walden Pond. Here he built himself a frame hut. This he shingled and plastered. He dug a cellar, making himself a light, airy, comfortable den in which he lived for two or three years. He planted a field of beans and raised some potatoes. His shack cost him twenty-eight dollars and twelve and one-half cents,—less, he said, than the rent he paid each year at Harvard for a stuffy student's room. His living cost him almost nothing.

He claimed with pride that six weeks' work in the year was quite sufficient to provide for his maintenance, leaving him free to observe and think forty-six weeks in the year. This was his theory of life. There is much in his doctrine. Without doubt, too large a part of human effort goes to keep up appearances and to provide luxuries which each thinks he must have because others deem them necessary; but, after all, Thoreau did not reason fairly. He borrowed his tools. He rented books that others provided. He was made welcome in the best homes of Concord and enjoyed intellectual society that represented a large expenditure both of time and money, to which he did not contribute a fair proportion. Moreover, his six weeks of labor represented the support of himself only. He did nothing for wife, child, or parent.

Nevertheless, his Robinson Crusoe life must have been in many ways a delightful one. He was a short, firmly knit man with a light complexion and serious blue eyes. His face had a grim look. He was a nervous, active walker, with great endurance. "He knew the country like a fox or a bird. . . . He knew every track in the snow or on the ground. . . . Under his arm he carried an old music-book to press plants; in his pocket, his diary and pencil, a spy-glass for birds, microscope, jackknife, and twine. He wore a straw hat, stout shoes, strong gray trousers to brave scrub-oaks and smilax, and to climb a tree for a hawk's or a squirrel's nest. He waded into the pool for the waterplants." He knew to a day when each flower should bloom, and was wont to declare that if waked from a trance he could tell the day of the month. The Merrimac River was his companion and confidant, the guardian of his animals and plants. "The fishes, and their spawning and nests, their manners, their food; the shad-flies; . . the birds which frequent the streams,—heron, duck, sheldrake, loon, osprey; the snake, muskrat, otter, woodchuck, and fox on the banks; the turtle, frog, hyla and cricket, which make the banks vocal, — were all known to him, and, as it were, townsmen and fellow-creatures."

Thoreau began a diary the year he left college, and kept it up all his life. He

lectured occasionally at Concord, in various towns of Massachusetts, and in the West. In this he was encouraged by Emerson, who felt that if people would not listen to Thoreau, they, at least, ought to do so. The only public movement in which he showed an interest was that of freeing the slaves. He wrote a number of articles for various periodicals. He enjoyed taking jaunts, and wrote most entertainingly of what he saw. His principal volumes, some of which were made up from his journals and magazine articles after death, are *A Week on the Concord and Merrimac Rivers,* 1849; *Walden, or Life in the Woods,* 1854; *Excursions in Field and Forest,* 1863; *The Maine Woods,* 1864; *Cape Cod,* 1865; and *A Yankee in Canada,* 1866. *Walden* is his best volume. Next come his *Essay on Wild Apples* and *The Succession of Forest Trees,* his most noted short papers. His works are a curious combination of observations on nature and society. No one else has written more appreciatively of the evergreens, the moose, and the song sparrow of our northern woods. A volume of his writings is an excellent companion in camp. Thoreau's books did not sell well in his lifetime. He had 1,000 copies of *A Week on the Concord* printed. Eight hundred were returned to him as unsalable. It was a standing joke with him that he had a fine private library of eight hundred volumes.

Thoreau was a very peculiar man in social matters. It was easy for him to say "No," but hard to say "Yes." He was a man of intellectual sympathies, but he was not affectionate. "I love Henry," said a friend, "but I cannot like him, and as for taking his arm, I should as soon think of taking the arm of an elm tree." He accepted invitations to dine with apparent reluctance, seeming to think the time wasted. He was glad to have Emerson or some congenial person with him on a tramp. Though a man of infinite leisure, he seemed to think that he could not afford to spend time on ordinary people. When on a lecture tour in the West, his Minneapolis admirers undertook to give a reception in his honor. The reception was held, but Thoreau was not present. He had heard of a rare plant on the bank of Lake Harriet. About train time he appeared, clutching his specimen, well pleased with himself and his walk.

Thorn Apple. See STRAMONIUM.

Thorold, Ontario, an industrial city, is eight miles south of Niagara Falls, on the Welland Canal and on the Grand Trunk and the Niagara, St. Catharines & Toronto railroads. The new Welland Canal (7 locks) is sufficiently large and deep to allow ocean-going vessels to pass through it. Hydro-electric power is available, and Thorold has manufactories of paper and pulp, abrasive materials, knit goods, glass, machine shop and foundry products, flour, smelted silver, electro-chemical products, tissue and pulp board. Building stone and cement rock are quarried near the city.

Thorold has public primary and high schools and a separate school, a library and several churches. The electric lighting system is owned and operated by the city. In 1921 the population was 4,825.

Thorwaldsen, tōr'wald-sen, **Albert Bertel** (1770-1844), a celebrated Danish sculptor. His father was an Icelander who had settled in Copenhagen to carry on the trade of a woodcarver. Young Thorwaldsen learned his father's trade and was placed at an early age in the Copenhagen School of Art. In 1793 he won a gold medal which carried with it a traveling scholarship that paid his expenses abroad for three years. He went to Italy in a Danish man-of-war and studied with Canova, the greatest of modern Italian sculptors. His reputation as a young artist was such that orders soon came to him from all parts of Europe. He remained at Rome twenty-three years. He returned to Denmark in 1819 and again in 1838. He made a fortune by his art, the greater part of which he bequeathed to build and endow a museum in Copenhagen. The models of his various works are nearly all to be found here. The building follows Greek and Etruscan models. It is a low, long, rectangle, of a solemn, impressive style. It contains a series of halls in which there are eighty statues, three long friezes, 220 small reliefs, and 130 busts designed or modeled by the great sculptor.

Night and *Morning* are celebrated low reliefs. His greatest work is considered a

group of *Christ and the Twelve Apostles,* executed for a church in Copenhagen. Much of his work is possessed by private owners in England. See COPENHAGEN; LUCERNE; SCULPTURE.

Thousand Islands, a group of islands in the St. Lawrence River just below Lake Ontario. The islands are caused by a belt of gneiss which lies across the course of the river extending from the Adirondacks in New York into Canada. The number of islands is estimated variously at from 1,500 to 1,800. Some are mere points of bare rock. Others have an area of several acres and are clothed with vegetation. The waters run swift and clear. The region is known as Thousand Island Park. The scenery is beautiful. The heat of summer is tempered by the river. The islands, both Canadian and American, have been occupied for summer residences. Alexandria Bay, the largest town in the park, is a noted summer resort. Steamers ply regularly. There are numerous large hotels for the accommodation of transients.

Thrace, thrās, in ancient geography, a region of somewhat indefinite boundaries extending from Macedonia eastward to the Euxine, now the Black Sea. The people were regarded by the Greeks as ferocious barbarians. The climate was considered terribly severe. Aside from the fact that the inhabitants were related to the people of Europe rather than to the Turks by whom they were afterward subdued, little is known of their language, religion, or race affinity. Implements and ornaments found in sepulchral mounds show that communication with Greece as well as Rome was frequent. The inhabitants are believed to have been ancestors to the modern Wallachians. The southern part of ancient Thrace now forms a part of Greece, and the northern district is included in Bulgaria and Jugoslavia. After the Greek rout of 1922 that part of Thrace east of the Maritza river passed to Turkey.

Thrasher, or **Thresher,** a thrush-like bird common in the United States. It is related to the mockingbird and the catbird. The best known is the brown thrasher, also called the sandy mockingbird from its color and power of mimicry. The brown thrasher is a fine songster. It frequents shrubbery and underbrush. It is about eleven inches in length with a long tail and short wings. Color, bright reddish above, under parts whitish shaded with cinnamon and marked with chain-like cinnamon streaks. It builds a bulky nest of twigs, leaves, etc., in a bush or occasionally on the ground in which it lays six whitish or greenish eggs profusely speckled with brown. The California thrasher has a long, curved bill and is different in color from the brown thrasher. Other varieties, all found near

Brown thresher.

the Mexican border, are the bow-billed, the Arizona, the St. Lucas, the Yuma, and the Crissal. See BIRD.

Thread, thrĕd, a strong, firm yarn used for sewing. The manufacturers distinguish between yarn and thread, holding that thread is composed of two or more strands twisted together.

The making of ordinary sewing thread is as old as the art of spinning. It is made of various materials, cotton, silk, and flax being the more important. Of these, cotton ranks first. The fibres are hollow, flat, and wavy. They do not slip. The long fiber of Sea Island cotton is best. The present cotton thread industry originated at Paisley, Scotland. The occasion is of interest. Paisley had been noted for its textile manufactures for many years. At the time of the Napoleonic wars the finest fabrics in the world were being made here.

In the manufacture of thread, the cotton is carded and combed and spun into the form of yarn, which is sized to add strength and consistency. This yarn is doubled and twisted; three doubled yarns are now twisted together for six-cord thread; for three-cord thread, three of the original yarns are twisted together. The thread is then bleached and wound ready for marketing. When first placed on the market, thread was sold in small skeins or hanks tied up carefully to prevent tangling. Lien thread may still be had in hanks. The harness-maker's linen thread is sold usually in balls. The threadmaker soon learned, however, to wind his thread on wooden spools. Spool making is an important industry in Maine. New England makes millions of spools, worth over $2,000,000, yearly.

The manufacture of cotton thread in America began in 1797. American mills now make many million dollars' worth of thread yearly. The industry is controlled by a few large corporations, located chiefly in New England. Ireland is headquarters for linen thread. Linen thread is stronger than cotton. Silk is used for sewing upon fabrics. The soft silken thread used for embroidery is known as floss. The size of a thread is designated by a number. Number eight is a very coarse thread. Three hundred is a very fine thread.

Three Rivers (Trois Riviéres), Quebec, the county town of St. Maurice County, is on the St. Lawrence River at the mouth of the Saint Maurice, and a short distance above the mouth of the Becancour. Rail transportation is provided by the Canadian Pacific and Grand Trunk railroads. Three Rivers is midway between Montreal and Quebec. It has a deep harbor with about two miles of wharfage. Hydro-electric power is available, and the city has manufactories of pulp and paper, concrete beams, cotton goods, lumber, boots and shoes, gloves, furniture, caskets, machinery, steel, iron pipe and mechanics' tools.

Three Rivers has a Catholic cathedral, nine public schools, a provincial technical school, convents, a college and a fine public library. The streets are paved and lighted and there is a good street railway system. In 1921 the population was 22,367.

Threshing, the process of freeing kernels of wheat and other grains from the head and chaff in which they grow. The term is applied also to clover, beans, flax, and other field crops, the seeds of which are liberated from pods. We can imagine primitive man pounding out his grain with a stick. The Chippewa squaw still guides her birch canoe through the standing rice, bends a cluster of stalks over the canoe, and beats out the kernels with a light club.

An early improvement was the flail. It consisted of a stout, short club, tied loosely by a thong to a long, slender handle. The thresher arranged his bundles of grain head to head on a threshing floor, untied the bands, seized the handle of his flail, and swinging the loose end around his head, brought it down with a thump on the heads of the bundles. The dextrous wielder of the flail did not allow it to rest on the grain at the end of a blow, but kept up a perpetual round-and-round movement, during which the club end gave the grain a thumping slap as it whirled by. In time of winter quiet Washington granted furloughs, permitting his men to go home and flail out their grain. This method of threshing is still practiced in central Germany and many other parts of Europe where fields are small and labor is cheap. In the uprisings of medieval times, before the use of gunpowder, the peasant's flail was a weapon by no means to be despised. A well de-

livered rap on a steel cap has laid many an armored knight low.

In the eighteenth century Michael Menzies, an ingenious Scot, endeavored to construct a threshing machine by attaching a series of flails to a revolving shaft turned by a water wheel. The flails came around with a flourish and rapped out the grain with delightful rapidity, but they pounded themselves into splinters in a short time and the plan was given up. In 1788 a more successful machine was patented by Andrew Meikle, also a Scotchman. It was run by water power. Grain was brought to the machine like grist to a mill.

The threshing floor has been for centuries an honored institution in the Orient. Bundles are laid on a circular floor of hard clay, and domestic animals are driven around for hours at a time to tread out the grain. In the Mosaic law it is written, "Thou shalt not muzzle the ox when he treadeth out the corn." The straw was stirred up with a wooden fork from time to time, and then taken away. The grain and chaff were next poured from a dish on a windy day. The wind carried the chaff away, and the wheat or barley fell in a golden pile at the winnower's feet. Later a fanning mill was used to blow away the chaff. The simplest method of all is that of holding a few heads in the hollow palm of one hand and rubbing them with the palm of the other. The straw is allowed to fall to the ground. The chaff is blown away by a puff of the breath and the operation is complete. The modern threshing machine imitates this process. The hollowed palm in which the heads are held is replaced by a curved surface, called a concave, studded with stout metal teeth. The rubbing of the upper palm is replaced by a swiftly revolving cylinder, also studded with teeth. Instead of falling to the ground, the empty straw is carried away by an endless apron. The chaff, short bits of straw, and kernels pass over sieves, through which, in lieu of the breath, a current of wind is driven from below by the paddles of a swiftly revolving fan. Machines of this sort were developed in the famous winter wheat region of the Genesee Valley of New York. About 1834 the Buffalo Pitts was manufactured at Buffalo by the Pitts Brothers. The earlier machines were operated by a treadmill. Later, the horse-power was introduced, and last of all the traction steam engine. The latter burns straw for fuel and is geared to draw the thresher from place to place.

The modern steam thresher is a model of economy and efficiency. Instead of requiring twelve horses to work on the horse-power, one team is needed to draw water for the engine. A huge belt connects the engine with the thresher. The pitchers lay the bundles on an endless apron. As the bundles advance, the bands are cut by projecting knives, and the loosened grain is fed into the maw of the machine. The empty straw is carried away by an automatic shaker. The chaff is blown away from the kernels on the sieves of the fanning mill. The chaff rejoins the straw and both are sent flying through a large pipe to the straw stack. Cog work causes the pipe or stacker to swing from side to side so as to build up a stack without assistance. The kernels fall from the sieve of the fanning mill into an elevator that carries the grain up in a shute and delivers it, bushel by bushel, into the farmer's sack, or into his wagon box. The wielder of the flail was satisfied with a sack or two of grain a day. The earliest machines, driven by a pair of weary animals climbing a tedious treadmill all day long, threshed at most fifty bushels of wheat a day; five hundred bushels made a good day's work for the horse-power machine. The modern steam thresher which replaces bandcutters, feeders, measurers, and strawstackers by never-wearying machinery, threshes 2,000 bushels of wheat a day with ease.

Thrush, a family of singing birds, including the American robin and the bluebird. The so-called brown thrush or brown thrasher, a fine singer, belongs to another family, being related to the catbird and to the mockingbird. There are over 150 world thrushes, some twelve of which are found in the wooded regions of the United States and Canada. The most celebrated singers are the wood thrush, the hermit thrush, and the veery or Wilson's thrush. The prevailing color of all three is cinnamon or olive brown with spotted breasts. The hermit builds on the ground. The two

others build in underbrush. The eggs are from three to five—of a greenish blue, like those of the robin, but smaller. Thoreau says:

> The wood thrush's is no opera music; it is not so much the composition as the strain, the tone, that interests us, cool bars of melody from the atmosphere of everlasting morning or evening. . . . Though heard at noon, there is the liquid coolness of things drawn from the bottom of springs. The thrush's song alone declares the immortal wealth and vigor that is in the forest.
>
> I admire the moderation of this master. There is nothing tumultuous in his song. He launches forth one strain of pure, unmatchable melody, and then he pauses and gives the hearer and himself time to digest this, and then another and another at suitable intervals. Men talk of the rich song of other birds, the thrasher, mockingbird, nightingale. But I doubt, I doubt.

In a poem written by Oliver Wendell Holmes for a banquet in honor of Whittier's seventieth birthday, he paid the modest Quaker poet the delicate compliment of calling him

> The wood thrush of Essex,
> Whose song echoes round us while he sits unseen.

Thucydides, thu-sĭd'ĭ-deez (about 471-396 B. C.), a Greek historian. Little is known of his early life save that he was born of a good Athenian family and had opportunity for study and travel. His chief work is a *History of the Peloponnesian War,* still an authority on the subject. He depicts with clearness the progress of public events, showing how each grew out of what preceded. In this respect he is unsurpassed. It is much to be regretted that he did not describe the arts, social life, and institutions of his day. There is a tradition that he was killed by robbers. At all events the history breaks off in the middle of a sentence at the end of eight books. Grote, the English historian of Greece, depended on Thucydides. When he reached 411 B. C., the point at which Thucydides' narrative ceases, he says with regret, "To pass from Thucydides to the Hellenism of Xenophon is a descent truly mournful. . . . The historical propositions and conceptions of Thucydides are exalted and philosophical to a degree altogether wonderful when we consider that he had no preëxisting models before him from which to derive them." Thucydides is beyond doubt the greatest historian of antiquity.

Thugs, a secret, semi-religious fraternity of robbers and assassins. They formerly infested the central and northern provinces of India. They traveled about the country in small bands, disguised as merchants or peddlers or as holy pilgrims. They ingratiated themselves with travelers and murdered them in lonely spots. Even the laborer by the roadside was not safe. Although they stripped their victims they appear to have been moved by a secret fanatical motive, rather than from lust of gain. One-third of their plunder they gave to their goddess. The bodies of their victims they buried, first digging a hole with a consecrated mattock, and performing certain religious rites. Each band had its leader, its teacher, its trappers, its stranglers, and its grave diggers. They were extremely deft in their operations. They strangled their victims with a scarf, turban, or slip noose, without shedding of blood. They were a terror to the natives who dared not, if they could, give information. They were as difficult to suppress as bandits. Between 1826 and 1835, 1,562 thugs were executed. The order was exterminated finally.

Thule, thoo'le, in ancient geography, the most northerly country known. The idea of the ancients was indefinite. By some the term is applied to Iceland; by others it is identified with northern Scotland. William Black, the Scottish novelist, utilizes the latter idea in his *A Princess of Thule.*

Thunder. See LIGHTNING.

Thurman, Allen Granbery (1813-1895), an American lawyer and politician. He was born in Lynchburg, Virginia, studied in Chillicothe, Ohio, taught school in the same town, and was admitted to the bar in 1835, going into partnership with his uncle. He attained great success as a lawyer. He was elected to Congress in 1844, became chief justice of the supreme court of Ohio ten years later, and was defeated for the governorship in 1866. He became Senator again in 1874. Three times he was a candidate for the Democratic nomination for president and after 1888, when he was defeated as nominee for vice-president, he retired to private life.

Thursday, the fifth day of the week. It is named in honor of Thor, the Anglo-

THUSNELDA AT THE TRIUMPH OF GERMANICUS

From the Painting by K. Piloty

Saxon god of thunder. The name might, with propriety, be written Thor's Day. The Thursday of Holy Week is known as Ascension Day, the day on which Christ ascended into heaven. The last Thursday of November has been celebrated for many years as the American Thanksgiving. See THOR; THANKSGIVING.

Thwaites, Reuben Gold (1853-1913), American historian and editor. He was born in Dorchester, Massachusetts. He studied in Yale University and in 1876 became managing editor of the *Wisconsin State Journal*. His historical writings are *Down Historic Waterways, The Colonies, 1492, 1750,* and *Father Marquette*. Among the works that he has edited should be mentioned *The Jesuit Relations* in seventy-three volumes, and *Early Western Travels* in thirty-five volumes.

Thyme, tīm, a fragrant plant belonging to the mint family. Thyme is related closely to marjoram and sage. The plant bears small whorls of lilac flowers in the axils of the leaves and at the ends of the branches. An aromatic oil is obtained from the leaves and stems. Two kinds are common in Europe, the garden thyme, prized in cookery, and the wild thyme. It is to the latter, an evergreen, creeping species, that Shakespeare makes pleasing reference in *Midsummer Night's Dream*. "I know a bank where the wild thyme blows." See MINT; SAGE; OIL.

Thymol, tīm'ol, in chemistry, a substance prepared from oil of thyme. It is known also as thyme camphor. The name is a compound of thyme and oil. Thymol looks like camphor and has the properties of carbolic acid. It is almost insoluble in water, but is soluble in alcohol and melts readily. Thymol is used in the dressing of wounds, as an antiseptic, and as a disinfectant. The drug has acquired recent importance as a remedy for the hookworm disease. Like carbolic acid, it is a poison and should be taken under the advice of a physician.

Tiber, the chief river of central Italy. It rises in the Apennines and flows about 212 miles southwest to the Mediterranean. It passes through the walls of Rome on its way to the sea. It is navigable for small steamers for about ninety miles. Within the walls of Rome it is about 300 feet wide and from 12 to 18 feet deep. Being fed by numerous mountain torrents, the Tiber is liable to serious inundations. At Rome it is a yellow flood, discolored by the burden of earth brought down from the Apennines. The sediment of the river deposited at its mouth has carried the outlet several miles into the Mediterranean. The river is inseparably connected with the history of the Romans, who called it "Father Tiber." A modern ship canal is projected along the northern bank from Rome to the mouth of the river with a view to make Rome a seaport.

Tibet, or **Thibet,** a country of Central Asia, subject to China. Area, 463,200 square miles. Population, 2,000,000. Tibet lies between India and Chinese Turkestan, occupying the roughest region of the world. The lakes of this region are the highest in the world, being 17,000 feet above the level of the sea. The climate is dry; the summers are hot; the winters are cold; the vegetation is scanty. A few sheltered valleys are productive of wheat, oats, barley, and vegetables. The greater portion of the country is either desert or alpine. Terrific storms prevail in the winter time. The goat, yak, and sheep occur both wild and domesticated. Lassa, on the Brahmaputra river, is the capital. The people are related to the Chinese. Their religion is a form of Buddhism. The head of the church is the grand lama. The people are controlled by religious orders dwelling in monasteries. The common people are oppressed and impoverished. Europeans are regarded with suspicion. The trade of the country is chiefly with China, to which wool, furs, gems, gold, and musk are exported. See YAK; LASSA; BUDDHISM; EVEREST; NEPAL; CHINA.

Tick. See MITE.

Ticonderoga. See ALLEN.

Tides, tīdz, waves due to the attraction of the sun and moon. The liquid portions of the earth's surface are more free to move than the solid rocky portions, and rise in waves toward the sun and moon. The same attraction draws the solid earth away from the opposite liquid surface. The waters on the far side are free to linger behind under the influence of inertia. The moon

causes two tides. The sun causes two. As the earth turns on its axis these four waves follow each other around the world ceaselessly. At the time of the new and the full moon, the tides of the moon coincide with those of the sun and are called spring tides. At half moon the tides are six hours apart, and are the lowest of the month. These are called neap tides. Rising water is a flood tide. Falling water is an ebb. A neap tide is about three-sevenths as high as a spring tide. Ships aim to take advantage of flood tide to enter or leave a harbor. As Shakespeare puts it:

There is a tide in the affairs of men
Which, taken at the flood, leads on to fortune;
Omitted, all the voyage of their life
Is bound in shallows and in miseries.

Although the sun outweighs the moon enormously, it is so far distant that its attraction is only about two-fifths as great as that of the moon. The tides caused by the moon are over twice as high as those of the sun. As a matter of fact the tidal waves lag several hours behind the sun and moon and are prevented by the continents from running a free course. The tides of London are so retarded by land masses that they are over two days behind time when they reach the mouth of the Thames. The tides of each harbor are charted from actual observation, and are published for the guidance of pilots and navigators. Ordinarily a tide rises and subsides quietly.

If a tidal wave enters a wide bay through a narrow channel or over a bar, it expires quietly with little rise or fall of water level. The tides of the Mediterranean and Baltic are not high. When a tidal wave from deep water enters a broad, deep harbor or deep mouth of a river and spends its energy up a narrow channel at the far end, the momentum of the water forces a tremendous mass of water inland. The tides in the Bay of Fundy rise to a height of thirty feet at St. John, New Brunswick, and sixty feet at the head of Chignecto Bay. The tide comes into the upper bay, the Basin of Minas, in a huge roaring front, with the speed of a race horse. Hogs feeding on the sands seize clams in their mouths and race for dear life up the rocky cliffs to a place of safety.

In large rivers the tidal wave does not die out until it has ascended a considerable distance, in the case of the La Plata and the Amazon to a height of 100 feet above sea level. The bore, as the tidal wave in a river is called, is a dangerous feature in the navigation of many rivers. Ships are obliged to seek safety at anchorage until the crest goes roaring by. The bore in one of the rivers in eastern Asia is twenty feet high and advances ten miles an hour. Tides are not confined to the ocean, but they are difficult to detect in the Great Lakes. Chicago is said to have tides of about one and three-fourths inches.

The French have made considerable progress in the construction of tide-mills—in harnessing the racing tides to turn the wheels of mills. The tides of geologic ages are thought to have run thirty-six times as high as the tides of the present day—due to the more rapid rotation of the earth.

Tien-Tsin, China, a city and treaty port in the province of Chi-li, is on the Peiho River at its junction with the Grand Canal, about 70 miles southeast of Peking, and 70 miles from the sea. The older part of the city is walled, and the streets of this section are narrow, dirty and poorly lighted. In the European quarter the buildings are well constructed and the streets are wide and paved, and are lighted with gas or electricity.

In 1860 Tien-Tsin was opened to foreign residence and trade. Easy access to the sea and railway connection with Peking, Hankow and the Manchurian coal fields were stimulants to trade, and the city soon became one of the busiest ports of China. Tea caravans going to eastern Russia start from Tien-Tsin, and large quantities of tobacco, furs, camels' wool, hides, coal and wood are exported by water.

Tien-Tsin has schools, a custom house, hospitals, a naval school, arsenals and many warehouses. While accurate census figures for Chinese cities are rarely available, it is known that Tien-Tsin has not less than 800,000 inhabitants.

Tierra del Fuego, tē-ĕr′rä dĕl fuā′gō, an archipelago at the southern end of South America. It is separated from the mainland by the Strait of Magellan. The islands have in all an area of 27,000,000 square miles and a population, chiefly

Indian, of several thousand. The natives are regarded lower than the Fiji Islanders. There are several fishing stations. Some gold is obtained. The passages between the islands are narrow. The scenery is impressive. The land is desolate. Mountains from 6,000 to 7,000 feet high are covered with snow the year around. The main island is divided between Argentina and Chile. The name signifies "Land of Fire." See MAGELLAN.

Tiffin, Ohio, the county seat of Seneca County, is on the Sandusky River and on the Pennsylvania, Baltimore & Ohio and Cleveland, Cincinnati, Chicago & St. Louis railroads, 42 miles southeast of Toledo. The manufacturing interests of the city are large, and from the numerous factories issue glass, art metal, emery wheels, pottery, elevating and hoisting machinery, motor trucks, furniture, machinery, gloves and other products.

Tiffin is the seat of Heidelberg University, Ursuline College and Tiffin Business University, and has good public schools, a Carnegie library, Federal building, attractive municipal and county buildings and the National Orphans' Home of the Junior Order of United American Mechanics. In 1920 the population was 14,375.

Tiflis, the capital of the Russian province of Georgia, is on the Kur River, 340 miles northwest of Baku. It lies in a valley between two ranges of the Caucasus Mountains, but is easy of access. There are two distinct quarters in the city, one, the modern Russian quarter, built on Western lines, the other being the native quarter, presenting a strikingly Oriental appearance.

Interesting structures are the monastery of Saint David, the old fortress, botanical gardens, a museum of natural history and sericulture, a library and the Cathedral of Zion.

Tiflis manufactures woolens, felt, cotton goods, carpets, wine, tobacco products, oil, leather goods and other commodities. The trade is extensive, as the city is the distributing center for Transcaucasia and has rail connections with ports on the Black and Caspian seas. The inhabitants—chiefly Russians, Georgians and Armenians—numbered 346,766 at the last census.

Tiger, a large animal of the cat family. It is next to the lion in size. The largest specimens attain a height of from three to four feet, and a total length, tail included, of from ten to fifteen or even eighteen feet. The tiger is without a mane. With respect to its head, ears, eyes, whiskers, teeth, paws, claws, tail, and general shape of the body, the tiger is simply a large tropical cat. It is more slender, more active, and more agile than the lion. Its fur is of a bright, shining yellow, beautifully banded with transverse black stripes. The tiger is confined to Asia, inhabiting the jungles of that grand division as far west as the Caspian Sea, and as far north as the southern limits of Siberia. It reaches its greatest size in India, particularly in the province of Bengal. The royal Bengal tiger is really a magnificent beast. As light of step as a cat, as fearless as a lion, unsurpassed for cunning, it is without comparison the fiercest four-footed living animal. It usually hides in thickets in the daytime and hunts by night. Unlike the panther and the leopard, it does not climb trees, but it gives chase to the largest game animals, lying in wait by their runways, or it lurks in tall grass near some water supply in order to spring upon its prey. It does not hesitate to leap into a herd of cattle, and is so powerful that it can throw a buffalo or small ox across its back and make off with it. Occasionally a tiger becomes accustomed to human food, and acquires a habit of hanging around villages, carrying away children, or even adults. It is then called a man-eater. The assistance of the government is not infrequently invoked to clear a district of some cunning, bloodthirsty, man-eating tiger. The loss of domestic animals and of human life is great. Tigers annually kill hundreds of people and thousands of domestic animals. The Indian government pays a large bounty for the destruction of the tiger. Singapore offers a standing reward for the ears of a tiger.

Tiger hunting is a famous British sport. White men, armed with rifles, ride elephants into an infested district, while a

band of natives, rendered desperate by the raids of tigers, beat the jungle with spears to drive the tiger out of his lair that he may be shot. The natives kill tigers by means of poison, and deadfalls, baited possibly with a live goat. In 1905 1,285 tigers were killed in India.

The tiger is caught frequently by the natives in pitfalls. A deep bottle-shaped hole is dug in the ground. The mouth is covered with a slight bamboo mat on the middle of which a kid is tied. Its bleating attracts the tiger. The tiger springs from a distance like a cat on a mouse, and plunges through the mat into the pit, from which he is unable to escape, as the loose sides of clay afford no hold for his claws. It is a task to imprison a tiger in a cage. A royal Bengal tiger is worth $1,000 in Hamburg. The Hamburg dealer buys very probably in Singapore. The tigress brings forth from two to five cubs at a time. Young tigers are easily domesticated. Tame tigers are not infrequently seen in India.

For many details of structure and disposition, see article on CAT.

Tigris, a river of western Asia which rises near the Euphrates in the mountains of Kurdistan. It has two branches and together they flow southeastward, joining the Euphrates at Kurna, ninety miles northwest of the Persian Gulf. Its length is 1,150 miles. It forms the eastern border of Mesopotamia, and on its banks stand the cities of Bagdad, Mosul, and Diarbekir, also the ruins of Nineveh. The river is rapid, its volume is variable, and it is navigable for steamers to Bagdad, and for small boats to Mosul. Many important historical events occurred in this vicinity and are recorded in the Old Testament, where the stream is known as Hiddekel.

Tilden, Samuel Jones (1814-1886), an American jurist and statesman. He was born at New Lebanon, New York. He was educated at Yale and at the University of the City of New York, receiving his degree in 1837. He was admitted to the bar in 1841. He had an enormous law practice. In 1855 it was said that over one-half the railways having offices in New York City were his clients.

While in college young Tilden took an interest in politics being a supporter of Martin Van Buren. In 1845 he entered the New York state legislature and took a hand in quieting the anti-rent uprising in the Mohawk Valley. From that time on he was recognized as an important member of the Democratic party, of which, in 1868, he became the acknowledged leader. Tilden was one of the most determined opponents of the "Tweed Ring," indeed he conducted the suits against Boss Tweed and that infamous combination.

Tilden was elected governor of New York in 1874, and two years later he was made the Democratic candidate for the presidency. He received a majority of the popular vote, but, as his supporters believe, the Republicans manipulated the returns in Louisiana and Oregon in such a way as to give his opponent a nominal majority in the electoral college.

Tilden bequeathed his large fortune, some $5,000,000, to New York City for the endowment of a public library. The will was contested in the courts and was broken. One of the heirs, Mrs. William B. Hazard, who was entitled by the decision to one-half the estate, declined to receive it, desiring that Mr. Tilden's wishes be carried out so far as lay in her power. The Tilden Trust Fund, as this bequest was called, was combined with the funds of the Astor Library and the Lenox Library for the support of a single New York Public Library. The Tilden bequest is now known as the Tilden Foundation. See ELECTORAL COMMISSION; TWEED.

Tilefish, a species of fish inhabiting the sea, especially the very deep waters. The fish has an interesting history, for the species was discovered and lost many times. It was first seen in 1879 by a group of Nantucket fishermen, who found it a very delectable food. In 1880 and 1881 more of them were discovered. In 1882 a cold current from the north rushed into the usually warm Gulf Stream and annihilated many species of fish, including the tilefish.

The tilefish is a large, bright-colored, active fish, usually weighing from ten to forty pounds. Because it is such a nutritious food, the United States Fish Commission made every effort to learn its whereabouts, but apparently the whole species was destroyed by the cold current.

Tilley, Sir Samuel Leonard (1818-

1896), a Canadian statesman, was born at Gagetown, New Brunswick. He did not enter the political field until 1850, when he was elected to the New Brunswick legislature. He was a keen analyst and a good speaker, and his influence and power increased steadily. From 1860 to 1865 he was provincial premier, and he became one of the most ardent confederationists. Sir Samuel was a member of the first Macdonald ministry, and was Minister of Finance in the second Macdonald government, 1878 to 1885. Before 1878 and after 1873 Tilley was lieutenant-governor of New Brunswick, and he held the same post from 1885 to 1893.

Tillman, Benjamin Ryan (1847-1918), American politician. He was born in Edgefield County, South Carolina, and was educated at Bethany Academy. He was a Confederate officer in the Civil War until a severe illness caused the loss of his left eye, and as a result of this he was forced to retire from military service. He was himself a planter and soon became interested in the industrial and technical educational advantages of the state and bent his efforts toward advancing the agricultural interests of the South. He was elected governor of South Carolina in 1890 and again in 1892, and has served as United States Senator since 1895. He is known as "Pitchfork" Tillman among those who are familiar with his power of invective. He established the Clemson Agricultural and Mechanical College for Boys, and the Winthrop Normal and Industrial College for Girls at Rock Hill. Through his efforts the South Carolina Constitutional Convention of 1895 adopted the educational requirement for suffrage. He instituted the dispensary system which placed the selling of liquor under state control.

Timbuctoo, tĭm-bo͝ock′to͞o, a city of Africa. It is situated near the Niger River, near the southern border of the Sahara. It is reached from Senegal by steamer up the Niger or by caravan from Fez, Morocco. The city is surrounded by half ruined walls. It is peopled by Arabs and others. Population, 12,000. Since 1884 Timbuctoo has been the administrative center of a French military possession. A railway is under way from Algiers southward to Timbuctoo. The city is a center of trade in gold, gum and rubber, ivory and fruits, collected in the basin of the Niger, and in ostrich feathers from the Sahara. The latter is here a prairie rather than a desert. The natives raise millet, wheat, rice, and earth-nuts. About one-third of the imports and exports are carried by the Niger and two-thirds by caravan. When it sets out from Algiers the Fez caravan not infrequently numbers 5,000 camels. They are laden with flannel, sheeting, calico, sugar, tea, padlocks, hinges, chains, tacks, nails, wire, beads, necklaces, hand mirrors, bracelets, rosaries, silver, prayer-rings, brooches, essences, perfumes, glassware, lace, yarn, needles, scarfs, paper, soap, tobacco, knives, weapons, medicines, salt, and dates. They return with loads of ivory, gold dust, tanned hides, baskets, and ostrich feathers. The overland trip requires thirty days each way. Two round trips are made yearly between Algiers and Timbuctoo. See FEZ; CARAVAN; NIGER.

Timothy Grass, a valuable fodder grass. It is so called from Timothy Hanson, who carried the seed from Europe to Maryland about 1720. It seems to be native in New England, but it was probably introduced at an early date from Europe. In that section it was formerly called Herd's grass, from the name of a New Hampshire farmer who introduced its culture. In *Snowbound* Whittier speaks of shaking down "Herd's grass for the cows." It is a tall grass, affording excellent pasture; and forage as well, if cut early, before the stalks become too hard. It is called cat-tail, from the shape of its spikes, and Herd's grass. It is frequently sowed with red clover from a notion that a combined growth will be heavier than if the land were sowed to either plant alone. See BLUE GRASS.

Timur, tī-mo͝or′, or **Tamerlane** (1333-1405), a Mongol emperor of Asia. The latter name signified Timur the Lame. He was distantly related to Genghis Khan, and restored his empire, making Samarkand his capital. His rule extended from the Mediterranean to the border of China. He was a Mohammedan. He aimed at universal dominion. "Since God is one," said he,

"and hath no partner, therefore the vicegerent over the lands of the Lord must be one." See SAMARKAND; GENGHIS KHAN; TARTAR.

Tin, a well known silvery white metal. It is softer than lead and may be hammered or rolled into exceedingly thin sheets known as tin foil, but grows brittle at a temperature of 200° C. and melts at 228°. Tin ore or tin stone is a compound of tin and oxygen. It occurs chiefly in granite rocks where it is mined like gold ore, but, like gold dust, it is also to be sought in the gravel of valleys where it has been carried by torrents as the granite ledges have crumbled away. Tin occurs in nearly all the granite states of the Union. The mountains of New England, the Shenandoah Valley, Virginia, North Carolina, and California have yielded tin ore in small quantities, but the only American mines of consequence are found in the Black Hills of South Dakota. The entire American production is about 30,000 long tons yearly.

The tin mines of Cornwall in England are celebrated and have supplied a large part of the world with tin since the day of Julius Caesar. The Phoenicians employed slaves to work the tin mines of Spain. Agricola, an early Roman historian, mentions the tin mines of Portugal. The granite ledges and gravels of Devonshire, Brittany, Bohemia, Finland, and Mexico, produce tin. The enormous modern demand for tin has been met in part by the Straits Settlements of Asiatic waters, at present the most important tin-producing district in the world. The mines of southeastern Asia have been worked for 400 years. It is thought that long ago they must have furnished the tin employed in the manufacture of the implements used in the prehistoric bronze age. Tin is found in Australia, Tasmania, and Bolivia.

A considerable portion of the tin supply goes into the manufacture of bronze, for an account of which the reader is referred to the article under that title. Britannia metal, used in the manufacture of toys and of tableware designed to imitate silverware, is composed of from eighty-two to ninety parts of tin alloyed with antimony and a small admixture of copper and sometimes zinc. Pure tin, like silver, resists rust. Tinware is made of sheet iron coated with tin, which, especially in the case of tin cans for preserving vegetables and fruits, excludes the air and prevents decay. America is obliged to send more money abroad for tin than for any other metal. We import about 26,000 tons a year from England and the East Indies.

To make commercial tin out of this imported ingot tin, steel or iron plates are dipped in a tank of molten tin and are then annealed by a proper degree of heat in ovens. The American manufacture of so-called tin, employs about 40,000 people and about $243,000,000 of capital. The product is valued at about $349,000,000. Formerly tinware was made by cutting the material into suitable sheets and soldering them together, but now almost all "tin" goods are made by stamping the article out of a single sheet. Several thousand people are engaged in this work, to say nothing of the manufacture of japanned and enameled tinware. Half of the world's supply of tin is consumed in the United States. The price in New York has ranged in recent years from twenty-nine cents to thirty-eight cents a pound. American manufacturers of tin plate are protected by a duty of one and two-tenths cents a pound.

Tinder. See FLINT.

Tintoretto, tin-to-rĕt'to (1518-1594), a Venetian painter. He was a native of Venice. His father was a dyer, in Italian, a tintoretto, by trade. The young Tintoretto studied with Titian. It is considered that he had a knowledge of color from his father's trade and a knowledge of drawing from Michelangelo. He painted so rapidly as to gain the name of Il Furioso or the madman. His paintings are represented in the galleries of Florence, Madrid, London, Berlin, Dresden, Vienna, Paris, and especially in Venice, his native state. *Paradise,* in the palace of the Doges, has the honor of being the largest oil painting known. Ruskin gave Tintoretto place among the world's great painters, but this is not the popular verdict. See TITIAN; MICHELANGELO.

Tippecanoe, a famous Indian battlefield. It is near the city of Lafayette, Indiana. See HARRISON; TECUMSEH.

Tissot, tē-sō′, **James Joseph Jacques** (1836-1902), a French painter. He was born in Nantes, and was a pupil of Ingres, Lamothe, and Flandrin. His first models were Parisian society women, and his brilliant pictures attracted a great deal of attention. He discontinued his exhibitions in the Salon in 1870, but when he re-appeared in 1894 his aim in life and artistic practice had undergone a total change. As the result of a sudden bereavement he had turned to Palestine, and there spent several years in successful effort at reproducing the background and atmosphere of Oriental life. He exhibited a series of pictures illustrating the life of Christ. There were 540 in all, and for the first 365 he is said to have received over a million francs from a French publishing firm. The 540 pictures are now in the Brooklyn Institute of Art and were purchased for the sum of $60,000.

Titanium, a metallic element. The atomic weight is 48.0; the symbol, Ti. Titanium does not occur free. It was separated in 1791. It is a gray metallic powder not unlike iron in appearance. It occurs in many ores, rocks, clays, and other soils, as well as in meteorites. By means of the spectroscope we know that it exists in the sun. Titanium constitutes a considerable percentage of certain iron ores found in Canada, Sweden, and Norway. Certain ores of the Adirondack region run as high as fifty-three per cent of titanium and are in reality titanious ores containing iron. Titanium is added to iron and carbon in making steel rails, car wheels, and other steel articles requiring strength. In fact, the name titanium comes from the titans, the strong giants of the ancient mythology. Crystals of titanite, a composition of silicon, calcium, and titanium, are found in the limestones of St. Lawrence County, New York. A variety known as sphenes is cut for gems. The finest specimens come from Switzerland and the Tyrol.

Titans, tī′tanz, in Greek mythology, a race of gods, children of Uranus (Heaven) and Gaea (Earth). According to the poets, there were six male Titans: Oceanus, Coeus, Crius, Hyperion, Japetus, and Cronus: and six females: Theia, Rhea, Themis, Mnemosyne, Phoebe, and Tethys. Instigated by their mother, they deposed their father and set Cronus in his place. To do this they released the hundred-handed giants and the cyclops from Tartarus where Uranus had confined them. When Cronus came to power, he again imprisoned the giants and the cyclops. Later Zeus, the son of Cronus, caused his father to disgorge the children he had swallowed at birth, and led them against his father. After a terrible war of ten years Cronus was dethroned. Zeus was obliged also to summon the prisoners from Tartarus before he could win the victory. From the cyclops he received the lightning which Minerva had invented and taught them to make. The triumphant Zeus, like his predecessors, did not care to have hundred-handed giants and "round-eyed" monsters roaming freely in his domain. He therefore shut them up again in Tartarus, where the cyclops work at the forge of Hephaestus. The Titans during their wars were said to have tried to scale heaven by piling mountain upon mountain. They took up Mount Ossa and piled it upon Mount Pelion, whence the proverbial expression, "to pile Ossa upon Pelion." It is thought that Milton drew his notions of Satan's rebellion from the story of the Titans' War. The descendants of the Titans, Prometheus, Helios, and Silene, are also called Titans. In general, a Titan is regarded as a giant, the embodiment of lawless strength. See Zeus; Cyclops.

Titian, tĭsh′an (1477-1576), a celebrated Venetian painter. Titian painted many religious pictures—Madonnas, Holy Families, *The Descent From the Cross,* etc., also many portraits of Emperor Charles V and other distinguished people. Venus and female figures were favorite subjects. Little is known of Titian's private life. He is believed to have lived in luxury, and to have died of the plague. He is known to have painted at Bologna, Augsburg, and Rome; but his favorite place of residence was Venice. He kept at work until he was over ninety. Over one hundred of his paintings are shown in the museums of Venice, Rome, Madrid, Florence, and Naples. A few are at Dresden, Berlin, and London. Art critics consider Titian a great

master of coloring, of light and shade. The private observer feels, however, that Titian is satisfied with mere beauty and that something is lacking. One does not seem to get more thought out of his pictures the longer he looks at them. Titian is considered the master of all portrait painters, the greatest colorist of all the schools. Michelangelo said: "It is a great pity they do not learn to draw well in Venice; this man would have had no equal if he had strengthened his natural genius by the knowledge of drawing." See RAPHAEL; PAINTING.

Titicaca, ĭt-ē-kä′kä, the largest lake of South America. It is situated in the great trough of the Andes at an elevation of 12,635 feet. It is about 116 miles long and one-third as wide. Its surplus waters are drained off southward, but are lost in alkali plains, once part of the lake itself, and do not leave the basin. The region is too cold for Indian corn, but it is inhabited and steamers ply on the lake. There are several islands. These and the adjacent shores bear the remains of stone buildings belonging to a prehistoric age. Huge blocks of stone have been cut and fitted with a nicety indicating architectural skill of no mean order. Peruvian engineers are considering the possibility of constructing a canal leading eastward through the Andes. This, with a view to utilizing the water for electric power to be used in lighting and manufacturing. See ANDES; PIZARRO; PERU.

Titmouse. See CHICKADEE.

T. N. T. See TRINITROTOLUOL.

Toad, tōd, a genus of cold-blooded animals closely allied to the frog. The life history of the toad is like that of the frog. It advances from egg to tadpole, with all its changes, to a toad. It has toothless gums, squat body, warty skin, and tongue of lightning speed. The hind toes are more or less webbed. The tree toad of Borneo has immense webbed feet, by means of which it is able to sail on a down course like a flying squirrel. Like frogs, toads sleep during the winter and spawn in the spring. They visit ponds for this purpose. The female deposits several thousand eggs. The spawn is deposited in long strings. The young toads are hopping about on dry land in about fourteen weeks. They are likely to come out of the water in great numbers during a shower. No doubt this is the explanation of the popular notion that showers of toads fall. The male toad of Surinam lifts the spawn and places it on the back of the female. Here it remains in curious honeycomb cells until the young toads are ready to hop away for themselves. The young toad is much smaller than the young frog.

The common toad is said by gardeners to be invaluable for its assistance in destroying insects. In this respect a toad is worth dozens of birds, and it lays no claim to a share of the fruit. Though repulsive in appearance, toads are the most harmless of animals. Certain pores about the eyes have the power of secreting and ejecting an acrid fluid that renders the toad less acceptable to frog-eating animals. The toad is the type of ugliness. A notion that handling toads will produce warts is as unfounded as many of the notions of what will remove them. Shakespeare expresses the popular idea of this creature:

> Sweet are the uses of adversity
> Which, like the toad, ugly and venomous,
> Wears yet a precious jewel in its head.

Toadstool. See MUSHROOM.

Toast, a slice of bread parched or slightly scorched before the open fire. The digestive juices attack the toast even more readily than stale bread. For this reason, it is a favorite diet for invalids, or when a hearty meal is not desired. It was the custom in the sixteenth century to place a piece of toast in the bottom of the wine glass. In this way the term passed to a drink taken at table in recognition of an honored guest or the reigning belle of the season. By another transition, the term is applied to a sentiment to which an after-dinner speaker is called to respond. See BREAD; FOOD.

Tobacco, a narcotic plant, the leaves of which are used for smoking, chewing, and as snuff. Columbus, Drake, Sir Walter Raleigh, and other early discoverers found it in use among the American Indians who smoked the leaves, not only socially and individually, but in the ceremonial pipe of peace and around their council fires. The practice was introduced into Europe and became general in spite of determined opposition in high quarters. Pope Urban

VIII went to the length of excommunicating tobacco users, and no less a personage than King James I issued a "counterblast" against the weed. Tobacco was the first crop to bring money to the settlers of the New World. The prospect of tobacco shipments played an important part in colonization. The principal business of Maryland and Virginia with the mother country, from the purchase of a harpsichord or a wife to a roll of cloth or an implement, was transacted in terms of tobacco and payment was made in tobacco. The Southern colonial planter packed his tobacco in hogsheads. A hogshead was laid on its side, fitted with a pair of shafts, and trundled off like a farm roller to the nearest river landing. At the close of the American Revolution, the new states were able to ship 118,460 hogsheads of tobacco leaf in a single year, 1790.

Over 100,000 American farmers raise tobacco as a chief crop. Leaf tobacco brings prices varying from two cents to two dollars a pound, according to kind and quality, the latter price being for wrapper leaves of a quality difficult to obtain. Tobacco is everywhere an annual. It grows shoulder high, with broad, ovate, oily, heavy-scented leaves, arranged on a strong stem. The large leaves near the ground attain a length of eighteen inches and a width of six. Its culture is not very different from that of cabbages. A dry, warm, deep, rich, sandy soil is best. Like the grape, tobacco is sensitive to soil and surroundings. The plants are started from seed in a specially prepared and sheltered plot. They are transplanted to the field later on and are worked like corn. Imperfect leaves are removed. The top is cut off that the strength of the plant may center in eight or ten of the lower leaves. As the leaves approach maturity, they are cured by undergoing a sweating process and are baled for market.

Prior to the Civil War Virginia led the Union in the production of tobacco, and Richmond is still a large tobacco center. Named in order of amount produced, the leading ten states are now Kentucky, North Carolina, Virginia, Ohio, Tennessee, Wisconsin, South Carolina, Pennsylvania, Maryland, and Connecticut. The United States is now the chief tobacco-producing and consuming country of the world. The yield reported for the year of the last census reached the enormous total of 1,117,682,000 pounds, of which Kentucky and the territory tributary to Frankfort and Cincinnati raised a half, Virginia and the Carolinas nearly one-third, and the rest of the Union the remainder. The Connecticut Valley raises a tobacco celebrated for cigar wrappers. A section of Wisconsin raises tobacco profitably. The worn-out fields of North Carolina have sprung into notice as producers of a certain variety of mild tobacco. Lands supposed to be of little value yield large returns. A small green variety is raised quite generally in the Northern States for private consumption as smoking tobacco.

Mexico is a large producer of tobacco. Cuban tobacco is noted for its flavor and is much used in the manufacture of cigars The entire Caribbean region produces luxuriant tobacco. The Manila product has a wide reputation. Tobacco raising has spread rapidly in Europe. Turkish tobacco is celebrated. Hungary raises a large amount. The United States imports some of the more expensive grades of tobacco, especially Sumatra leaves for cigar wrappers and Havana for wrappers and fillers, but our exports of leaf tobacco, chiefly to Canada and the countries of Western Europe from Gibraltar to Hammerfest, amount to 300,000,000 pounds, a full third of the annual crop. Tobacco is a source of national wealth. Large value in tobacco leaf is easily transported at so little expense that tobacco manufacturing is not confined to tobacco-raising districts.

The growth of the tobacco industry has been rapid. The Indians raised small patches practically everywhere east of the great plains. In 1612 John Rolfe cultivated tobacco in his garden at Jamestown. In 1618 the colony produced 20,000 pounds. The American production in 1640, was 1,300,000 pounds; in 1680, 25,000,000 pounds; in 1770, 107,391,000 pounds; in 1776, 2,440,947 pounds; in 1839, 219,000,000 pounds; in 1859, 434,000,000 pounds; in 1862, 163,000,000 pounds; in 1900, 814,000,000 pounds; 1920, 1,508,064,000, in 1921, 1,117,682,000 pounds.

In some years the world produces 3,000,000,000 pounds of tobacco. The United States, Cuba, Mexico, Turkey, Egypt, the Philippines, the Transvaal, and the Dutch East Indies, are the exporting countries; Great Britain, the Netherlands, and Germany are the heavy buyers. The sale of tobacco is a government monopoly in France, Italy, Spain, Austria and Hungary. The habit of using tobacco may be regarded as well-nigh universal.

See PIPE; CIGAR; FRANCE; NICOTINE; NARCOTICS; OPIUM; BETEL; HASHISH.

Toboggan, a long narrow sled made usually of a single board turned up like the runner of a skate at the front end. The name is derived from the American Indians. Toboggans were first used by the Canadians to drag peltry and camp supplies over the snow. Sliding down hill on a toboggan, or tobogganing, as it has been called, has become a favorite sport in Canada and the colder parts of the United States. A well made toboggan carries from two to five persons crouching one behind another. Tobogganing has been introduced in the Engadine, Switzerland, as a winter sport for tourists. A slide at the head of a cañon descends 600 feet in three-quarters of a mile. The run, including a final turn up a little hill at the foot, has been made in fifty-nine seconds. See SKI.

Tocqueville, tŏk′vĭl, **Alexis de** (1805-1859), a French statesman and writer. He was born at Paris and was educated for the law. In 1831 he was sent to the United States by the French government to investigate our penitentiary system. This he did and made a report that attracted attention. While in America he took notes freely, and on his return he wrote *Democracy in America,* 1835. It was a work somewhat in the vein of Bryce's later *American Commonwealth.* It was the first scholarly examination of American institutions. It was translated into many languages. It won Tocqueville a seat in the French Academy. A brief edition was for a time a favorite textbook in American colleges. In 1839 Tocqueville was elected to the French chamber of deputies. He was not in sympathy with the Orleans party. Under the presidency of Louis Napoleon he voted against the measures of the radical democrats. In 1849 he held the portfolio of foreign affairs for five months. When Louis Napoleon broke faith with the people and sabred his way into the imperial office December 2, 1851, Tocqueville retired to private life and devoted himself to the labors of a historian. *The Ancient Régime and the Revolution* appeared in 1856. Socialists consider that Tocqueville was an observer of penetration, a profound student of democracy, but that he was afraid to give the people of France the reins. His interest in democracy was intellectual, not sympathetic. See BRYCE.

Toddy, the fermented sap of several species of the palm. It is a favorite drink in India, Borneo, West Africa, and Brazil. The wild date palm, the palmyra, and the cocoanut palm yield toddy. Fresh toddy, like sweet cider, is rather a pleasing drink, but it soon ferments. Arrack is obtained from toddy by distillation. See ALCOHOL; CIDER; WINE; PULQUE, etc.

Toga, the principal outer garment of a Roman citizen. See CLOTHING.

Togo. See RUSSO-JAPANESE WAR.

Tokay, tō-kā′, a town in upper Hungary. It lies on the hot southern slopes of the Carpathians. The vicinity is noted for its vineyards. The famous Tokay wine is sweet and heavily scented. The district produces millions of gallons of wine yearly. The vintage is celebrated by an annual festival. The Tokay grape of American markets is an oval grape of a purplish color raised in California. It was introduced at an early date by the Spanish missionaries.

Tokio, tō′kē-ō, formerly Yedo, the capital of Japan. It is situated at the head of a fine harbor on the east coast of the Island of Nippon. A river enters the harbor at this point. Many of the streets are occupied by canals, forming islands in place of squares. A central island is occupied by the emperor's palace, the most notable edifice in the city. It is surrounded by fine gardens. The canals are crossed by many bridges. The government buildings and residences of the foreign ministers are on an outer circle of islands. The city has suffered severely from earthquakes. Shocks average one a day. For this reason, no doubt, the city is a vast aggregation of one-story wooden houses, not likely to shake

down. The walls are of sliding bamboo sections. The roofs are of red tiling. In warm weather the walls and partitions are slid aside, leaving the houses open like sheds. There are no tables or chairs. The inhabitants eat, sleep, sit, and sell goods on mats. The people are cleanly. There are over 1,000 public baths, in which half a million baths are taken daily at a fee of one and one-fourth cents each. Watchmen on high towers guard against the outbreak of fires. Goods pass through the streets on drays pulled and pushed by men. The ordinary cab is the jinrikisha, a light, two-wheeled cart drawn by one or more swift, stout-legged runners.

The city is well provided with water, gas, electric lights, street railways, paved streets, public libraries, and attractive parks. A complete system of education has been established on the German model. There are common schools, high schools, and a university attended by 3,000 students. There are numerous native temples and several European churches.

Tokio became the home of the emperor in 1868. Its commerce and manufactures are carried on at the port of Yokohama, situated at the mouth of the bay seventeen miles distant. Trade in opium is forbidden. Tokio had a population in 1920 of 2,173,162.

See JAPAN; YOKOHAMA.

Toledo, a city of Spain. It is situated on the Tagus River near the center of the kingdom. It is the capital of the province of Toledo, occupying the basin of the upper Tagus. It was once a densely forested region. Only a few groves are left. The city is the center of much mineral wealth, including gold, silver, lead, iron, quicksilver, copper, and tin. Peas, potatoes, olive oil, wine, flax, oranges, lemons, chestnuts, and melons are for sale in the markets and are exported in considerable quantities. Bees and silkworms do well. Toledo was once noted for silk, woolen cloth, pottery, soap, chocolate, guitar strings, and, above all, for the famous sword known as a Toledo blade. Swords and firearms are still the most important manufactures. Toledo was for centuries the capital of Castile. The cathedral of Toledo ranks next to that of Seville. The Alcazar or royal palace is one of the imposing buildings of Spain. Toledo was the center of the Spanish inquisition. Some famous burnings of heretics took place in the square where bullfights are now held. The city's prosperity came to a close with the removal of the capital to Madrid in the sixteenth century. The population was at one time 200,000. The present population is about 25,000.

See SWORD.

Toledo, the third city of Ohio and the county seat of Lucas County, is on Maumee Bay at the mouth of the Maumee River, 9 miles from Lake Erie, 96 miles west of Cleveland and about 125 miles north by west of Columbus. Seventeen railroads, including the New York Central, Michigan Central, Pere Marquette, Toledo, St. Louis & Western, Cincinnati, Hamilton & Dayton, Hocking Valley and Grand Trunk serve the city. By water Toledo has connection with Chicago, Duluth, Detroit, Cleveland and other important lake cities.

DESCRIPTION. Toledo is built on both sides of the Maumee River and covers about 32 square miles. More than 800 acres have been set aside as parks, and boulevards link the parks and beaches together. Warehouses and factories line the water, while farther back are the residential sections. The largest of Toledo's parks, Ottawa Park, is 280 acres in area; Walbridge Park has a zoological garden; and Central Grove, Navarre and Bay View parks are attractive.

Many of the office buildings are in all respects modern, and the city and county buildings are noteworthy. The Federal building, municipal university, Masonic Temple, St. John's College, Toledo Medical College, Newsboy's Building, State Hospital for the Insane, Ursuline and Notre Dame Academies, St. Vincent's Hospital, St. Vincent's Orphanage, St. Francis de Sales School and Chapel, Museum of Art, Smead School for Girls, Y. M. C. A., Y. W. C. A. and Valentine Theater are all conspicuous structures.

INDUSTRY AND COMMERCE. Toledo is the commercial center for a rich and extensive farming, lumbering and mining region, and on the industrial side it increases in importance each year. There are upward of 600 factories, from which

issue plate and cut glass, bottles, elevators, electrical supplies, pig iron, malleable castings, automobiles, automobile accessories, boats, wagons, sugar, women's clothing, scales, excavating machinery and a host of other commodities. The preparation of coffee and spices is an important industry.

HISTORY. Originally there was a distinct settlement on each side of the Maumee, but in 1835 these were united and named Toledo. In the following year the settlement was incorporated, and after the opening of the Wabash & Erie and Miami & Erie canals the growth was rapid. The first railroad entered the city in 1837 and it was soon followed by others, all of which contributed to its growth. There was a contest between Ohio and the Territory of Michigan for possession of the site, in which Ohio won the victory. Population 1920, 243,164.

Tolstoi, Tŏl′stoi, **Count Lyoff,** a Russian novelist and reformer. He was born in the government of Lulu, south of Moscow, September 9, 1828. He inherited a title and a large landed estate. He was educated in languages and for the law at the University of Kazan. During the term of military service expected of each Russian he served in Caucasia. During the Crimean War he took part in the defense of Sebastopol. He wrote a brilliant description of the military events that fell under his eye. One of his earliest literary works was an autobiography, entitled *Childhood, Boyhood, and Youth.* At the conclusion of his military service he went to St. Petersburg, where he made the acquaintance of the Russian writer, Turgenieff, through whose influence he embarked definitely on a literary career.

In 1862 he chose for his wife the daughter of a Moscow physician. He then settled down on his estate. Tolstoi became much interested in the conduct of the Russian peasantry and the unequal distribution of wealth. He adopted the Sermon on the Mount word for word as a practical creed. Part of each day he was accustomed to dress himself in rough clothing and labor with his hands on some part of his estate. It is part of his theory that there is a certain amount of disagreeable work to be done in the world, and that each person should do some of the drudgery. If that idea were carried into effect he believed that it would be unnecessary for anyone to remain a mere hewer of wood and drawer of water. He took great pains to instruct the peasantry on his estate and to encourage habits of thrift and economy. In time of famine, he gave away his property with a free hand. He had a large family of thirteen children. His home is represented as ideal.

The list of Tolstoi's works includes many titles. Characteristic writings are *The Snowstorm, Two Hussars, Anna Karenina, What the People Live By, The Kreutzer Sonata, Politics and Religion,* and *The Resurrection. War and Peace* is an account of Napoleon's invasion of Russia. He depicts Napoleon as a mere monster without genius. Inasmuch as Shakespeare's writings show very little interest in the conduct and welfare of the common people, Tolstoi regarded Shakespeare as a mere scribbler. In musical affairs Tolstoi is correspondingly radical. He holds that Handel, Mozart, Haydn, and Wagner are merely popular, not great.

In 1901 Tolstoi was excommunicated formally by the authorities of the Orthodox Greek church. His religious views were practically Unitarian. He believed in the abolition of governments. Although a soldier in early life, Tolstoi early adopted the Quaker doctrine of non-resistance to evil. On this account, although not regarded with favor by Russian authorities, he was never disturbed seriously by the press censor or by the police department. He died November 19, 1910.

Tolstoi's sincerity and devotion cannot be doubted. A man of genius, he was at the same time possessed of deep sympathy for his fellow creatures. Had he lived in any other country he might have been a power, mighty and permanent, in directing its policy. As it is, his thought will pass mainly as the incoherent cry of a giant struggling against heavy, adverse currents in the vast ocean of Russian life.

See TURGENIEFF.

THOUGHTS FROM TOLSTOI.

No truth presents itself to two persons in the same light.

There are no more hopelessly deaf than those who do not want to hear.

All ideas that produce great results are always simple.

The battle is always won by him who has firmly resolved to win it.

Light remains light, even though the blind do not see it.

The more you feel like speaking, the more danger there is that you will say something wrong.

Only the increase of love in mankind can change the existing social system.

The poor wheel always creaks loudest. The empty ear of corn is always the tallest.

Conscience is the consciousness of one's purpose in the world.

The transient guests make the inn filthy and ruin it, and then they blame the keeper of the inn who had permitted them to do with it what they pleased. Thus do the people blame God for the evil in the world.

Tolu, a fragrant, pleasant-tasting balsam of South America. It is obtained by making cuts in the bark of a tree related to the locust or pea family. The trickling balsam hardens on exposure to air. It has soothing, healing properties. It is imported by the manufacturing druggist for use in compounding cough remedies.

See DRUGS.

Tomahawk, the war ax of the North American Indian. The tomahawk with which Powhatan prepared to end the life of Captain John Smith consisted probably of an A-shaped piece of edged stone, lashed with a buckskin thong into a wooden handle. Not infrequently a prong of deer's horn was thrust like the blade of a pickax into a hole in the end of a wooden handle. The early navigators found metal tomahawks a profitable article of trade. The natives gladly exchanged incredible quantities of fine furs for shining tomahawks. The tomahawk, the scalping knife, and the bow and arrow are the traditional Indian weapons. Of the three the tomahawk is most typical of Indian customs. When peace was concluded the braves sat about the council fire and "buried the tomahawk." When they were about to go on a warpath, they "dug up the tomahawk." The war pipe, as well as the pipe of peace, not infrequently took the form of a tomahawk. The blunt end of the ax was hollowed to form a bowl. The handle, usually a piece of sapling, was pierced by pushing out the pith to form the stem of the pipe. See INDIANS.

Tomato, a straggling herb of the nightshade family. Tomatoes are natives of Peru. They are closely related to ground cherries and potatoes. The fruit of the tomato corresponds to the "potato ball" to which we pay no attention. It is a large berry. There are perhaps a dozen wild tomatoes in the Peruvian region with fruit varying in color from red to yellow, in size from currants upward. The tomatoes in cultivation are from a common stock. A wonderful diversity in size of plant, time of maturity, size and color and shape of fruit, illustrates well the changes that may be brought about by cultivation. The importance of the tomato plant may be seen from the following table based on the estimates of the United States Department of Agriculture's report for the year 1921:

Acres of tomatoes	204,076
Tons raised	976,002

Indiana is the greatest tomato producer in the Union. The above figures take no account of the tomatoes raised in kitchen gardens. See TOMATO; GROUND CHERRY.

Tom Brown's School Days. See HUGHES, THOMAS.

Tom Thumb, the hero of a nursery tale found among the stories of the French writer, Charles Perrault, although it is claimed that the story was of Anglo-Saxon origin. Tom is the son of a poor woodsman and his wife. The child is scarcely larger than his mother's thumb, and is therefore named Tom Thumb. He has many adventures, in one of which he is swallowed by a cow. The name General Tom Thumb was given to Charles Stratton, a famous dwarf exhibited in 1842 and subsequent years by P. T. Barnum. See PERRAULT.

Ton, tŭn, an old English measure of capacity. The tun or ton was originally a large wine cask. According to English law and custom, each bulky commodity was measured by the space it occupied. Thus a ton of oak or ash timber was forty cubic feet; of flour, ten barrels; of potatoes, ten to thirty-six sacks; earth, twenty-three cubic feet; stone, sixteen cubic feet; salt, forty-two bushels; lime, forty bushels; while the long ton used in measuring coal and other coarse articles consists of twenty hundred-weight of 112 pounds each, or 2,240 pounds in all. The short ton in ordinary use

equals 2,000 pounds. In other words, the ton, in its original meaning, is a measure of capacity. The word, like bushel, has been transferred to a given weight. The metric ton, or 1,000 kilograms, equals 2,204 pounds. See TONNAGE.

Tongue, tŭng, in human physiology, a muscular organ placed in the floor of the mouth between the two branches of the lower jaw. With the exception of a few frog-like animals and some birds, the tongue belongs to all vertebrate animals. In some it is much more movable than in others. The tongue of the lion and of the snail is furnished with rough points, enabling it to be used as a rasp. The tongue of the woodpecker and of the chameleon is pointed with a barb, enabling it to transfix insects. The tongue of serpents is forked. The giraffe has a long, flexible tongue with which it is able to draw leaves and twigs into its mouth. The cat and dog are capable of shaping the tongue into a sort of cup, with which to lap water. The anteater of South America has a mouth about half an inch in diameter. It has a long, slender tongue which it can thrust out about nine inches.

The human tongue is used in speaking, licking, chewing, swallowing, and in spitting. The upper surface is paved like the Giant's Causeway, with the upturned ends of numerous nerves. The end of the finger is able, for instance, to distinguish between a solid and a liquid, a warm substance and one that is cold, an oily surface from one that is rough, etc., but the nerves of the tongue are able to do more. They can distinguish between sweet, sour, bitter, and salt, as well as detect the peculiar flavor of a thousand different articles of food. This special power is called the sense of taste. It is the special province of these nerves to taste the food that enters the mouth and to guard the stomach from poisonous or offensive diet. Each part of the sensitive upper surface of the tongue seems to have its special work to do. The nerves that detect sugar are not affected by spice. The nerves that detect a bitter taste do not detect salt. The nerves that detect sweets are situated on the fore part of the tongue, those that detect sour, farther back. In eating candy, for instance, it is natural to drop the head forward, so that the piece will fall on the front of the tongue. In tasting vinegar, it is natural to toss the head up, thus bringing the vinegar on the back part of the tongue. Sugar cannot be tasted immediately after hot soup or ice-water. Bitter is distinguished more readily than sweet or sour. One part of quinine can be detected in 1,000,000 parts of water.

An expert tea taster in the employ of a large tea importing house learns to discriminate between the different grades of tea to a nicety. The tongue of the professional wine taster becomes as sensitive to flavor as does the ear of a musician to sound. The nearest counterpart to the nerves of taste are the nerves of smell. They are even more delicate and more highly specialized.

Tonnage, tŭn′nāj, the carrying capacity of a ship. Wharf dues, canal tolls, pilot's fees, towage, etc., are based on the tonnage, that is, the size, not the weight, of the ship. One hundred cubic feet are considered a ton. In 1873 a congress held at Constantinople fixed rules for computing the tonnage of ships passing through the Suez Canal. Allowance is made for the space occupied by the engine room and screw shaft. Otherwise the capacity is determined by measurement of the total length and depth and average width. To this must be added storage capacity above the main deck. The total is the registered tonnage of the ship. It is made a matter of official record, so that it is not necessary to measure a ship every time the master pays canal or port dues. In ships contracting to carry freight by the ton, charges are based on the space occupied. Unless otherwise agreed, forty cubic feet of freight are reckoned a ton.

In railroad offices tonnage refers to the number of tons, by weight usually, of freight transported; in shipping circles tonnage has reference to cubic capacity only. The United States government levies a port duty of six cents a ton on transoceanic steamers coming into our ports. This tax is imposed upon the carrying capacity of a ship, and the ton, as spoken of in this connection, has no reference whatever to weight.

The gross tonnage of a ship includes the

cubical contents of the entire closed parts of the ship—everything which is sheltered from the weather. The *Mauretania,* for instance, has a gross tonnage of 31,500—which is to say that her cubical contents, without any deductions, are 3,150,000 cubic feet.

The tonnage tax is computed upon the net tonnage, which represents the money-earning capacity of a ship. In reckoning the net tonnage, deductions are made for the space taken by quarters for officers and crew, by the boilers and machinery, and by the coal bunkers. These deductions may amount to 70 per cent of the ship's cubical contents, and leave 30 per cent. Consequently the net tonnage of the Lusitania is 9,135.

When a ship enters New York harbor she is charged six cents a ton on this net tonnage. The fee for a single entry therefore depends upon the size of the ship. The present law provides that the maximum charge for a single ship shall be the equivalent of fees for five entries, regardless of the number of calls made during the year. Accordingly a ship the size of the Mauretania will pay to the United States government about $2,750,000 for the privilege of entering American harbors. In 1922 the total tonnage of vessels entering ports of the United States was 61,232,543 tons, and the total tonnage of vessels cleared was 61,683,228 tons.

Tonsure, tŏn′shur, a shaven place on the head of a priest or cleric. The Catholic tonsure or the tonsure of St. Peter consists of a bare circle on the top of the head. The first removal of the hair is performed by a bishop or cardinal and is one of the solemn rites of consecration to the priesthood. The candidate is pledged to shave the top of his head once a month. The higher the rank of a Catholic the wider may be his tonsure. The tonsure of the Greek Church, or the tonsure of St. Paul, consists in shaving, or at least clipping closely, the entire head. A third tonsure, the Celtic, or tonsure of St. John, consists in the removal of the hair in front of a line drawn over the top of the head from ear to ear.

Tontine, tŏn-tēn′, a form of investment. It is named for its suggestor, Lorenzo Tonti, a citizen of Naples who settled in Paris in the time of Mazarin. In its simplest form a tontine is a joint investment the profits of which are to be paid to the surviving investors. Payments cease when the last investor dies. In 1689, for instance, Louis XIV of France, then in need of money, organized a tontine of $70,000,000. It was divided into fourteen different classes, practically fourteen different tontines. Shares were placed at three hundred livres, $57.90 each. The French government pledged itself to divide a fixed sum annually among the surviving shareholders. This tontine existed forty years. The last shareholder, a widow, all others being dead, received an annual income of $14,185.50. At her death the obligation to pay dividends ceased. Numerous private tontines have been organized on a large scale. The tontine La Farge of Paris drew 60,000,000 francs from subscribers and then failed. A government tontine opened in England in 1789, ran for seventy years, and paid the surviving subscriber $210,150 a year. The tontine plan for erecting public buildings was formerly popular in the United States. A fixed rental was paid the surviving subscribers. Even though the return was small in comparison with the total amount subscribed, the subscribers who lived the longest derived a fine income. At the death of the last survivor the building reverted to the public, free of incumbrance. Some life insurance companies have adopted a tontine policy whereby the persistent payers of premiums reap a benefit from those who drop out. See INSURANCE.

Tonty, tŏn′tē, or **Tonti, Henri de** (1650?-1704), an Italian explorer. He was born in Gaeta, Italy, and after entering the French army accompanied La Salle to Canada and the United States. They undertook the first settlement in the Illinois country, and Tonty was left in charge of Fort Crèvecoeur, a little below the present site of Peoria. In 1681 he joined La Salle again and together they made the journey down the Mississippi to its mouth. He was then entrusted with the command of Fort Saint Louis, at Starved Rock. He lived among the Illinois Indians for several years and won their respect by his stern discipline.

Tony Lumpkin, in Goldsmith's comedy, *She Stoops to Conquer,* a young country squire. He is conceited, ignorant, loud-voiced, and mischievous, proud to display the vices of a man, and by no means abashed that he still possesses the follies of a boy. See GOLDSMITH.

Tooke, tōōk, **John Horne** (1736-1812), an English politician and wit. His father was a prosperous London dealer in poultry. When young Tooke was entered in an aristocratic school he thought proper to disguise this fact by speaking of his father as a "Turkey merchant." Against his inclination he was educated for the ministry. He held a small vicarage. His taste lay, however, in the direction of travel and in political writing for the newspapers. He was a violent opponent of the Tories. He represented a pocket borough in Parliament. He had many tilts with royal authority. He established the right of a newspaper to publish the proceedings of Parliament. He was noted for bright sayings which brought him not only fines but imprisonment. Among other incidents may be mentioned the circulation of a subscription paper to collect funds for the needy relatives of "the men murdered by the king's troops at Concord and Lexington." For this he was tried for treason, and was impoverished by a fine of $6,000. Many of his witty sayings have been preserved in the *Table Talk* of S. T. Coleridge.

Toombs, tōōmz, **Robert** (1810-1885), an American statesman. His father was a Georgia planter, the owner of many slaves. Young Robert attended Franklin College for a time, but, like many ambitious boys, finished at a Northern college. He took his degree at Union, Schenectady, New York, in 1828. He studied law at the University of Virginia, near the home of Thomas Jefferson. He was an able young fellow and ran the meager college course of the day before he was twenty-one years of age. In deference to family, which counted for much in his native state, a special act of the legislature was passed to enable him to begin practice without delay. He soon became a leading figure in his profession. During the Creek War in 1836 Toombs served as a captain of volunteers under General Winfield Scott. In politics Toombs was a Whig. From 1837 onward he served almost continuously either in the state legislature or in the national House and Senate. He was an uncompromising states-rights man, an insistent advocate of slavery. He was in sympathy with the ideas of J. C. Calhoun. He supported the compromise measures of Henry Clay and Stephen A. Douglas. Mr. Toombs even lectured in the North in advocacy of the system of tilling plantations with slave labor. On Lincoln's election to the presidency, Toombs was an advocate of immediate secession. He was considered for the presidency of the new confederacy. He entered President Davis' cabinet as secretary of state.

Toombs was not in favor of firing on Fort Sumter, but once hostilities were begun, he left the cabinet for the field. He was in charge of a Confederate brigade at the second battle of Bull Run and at Antietam. He disliked President Davis and lost faith in the Confederate cause. Although Toombs resigned his seat in the United States Senate, he was formally expelled by that body. At the close of hostilities he went to England to escape arrest. Later he returned to his native state and became wealthy in the practice of law. He refused to take the oath of allegiance to the general government and thereby forfeited his right to vote, but he was none the less a power in state politics. He led the movement in favor of Horace Greeley for president, and labored successfully for legislation requiring railroads to pay taxes on the basis of an assessed valuation. He won a suit for the state compelling the roads to pay up a large amount of back taxes. He was influential in the creation of a board of railroad commissioners.

Toombs was a fiery, impatient, eloquent man. He lacked the dignity of Lee and the stern devotion to principle of Stonewall Jackson, but he was by no means the reckless, fire-eating, unprincipled demagogue of anti-slavery writers. He was a prominent, erratic figure in the scenes preceding the Civil War. During the war he found too much fault to be helpful to those in authority. His best work was done after the war in championing the cause of the people and in building up the prostrate

commonwealth of which he was a disfranchised but devoted citizen.

See DAVIS; SECESSION; CONFEDERACY.

Top, a familiar toy. Most boys have made a conical top spin on its apex by twirling a projecting handle between the thumb and middle finger. A top of this sort, two of them in fact, may be made out of an ordinary spool for thread, first filling the hole in the spool with a rod the size of a slate-pencil. If the ends of the rod be left long to serve as handles, the middle of the spool—the part on which the thread is wound—may be whittled down to a point like the waist of an hour-glass, forming the two cones desired. If the head end of a common pin be cut off and driven into the wooden apex until the head of the pin affords a middle point for the cone to whirl on, we have a top or pair of tops fit for a prince. A large top may be driven by lashing it with a whip. Still another top is set in motion by winding a thong around the handle or body and then flinging the top down while the loose end of the thong is held in the hand.

Topaz, a precious stone. It is composed chiefly of aluminum, silicon, and fluorin. It has a glossy luster, but is almost as hard and as difficult to melt as a diamond. We cannot speak of a topaz color, for the gem may be colorless, or it may be of a straw-yellow, gray, greenish, bluish, or even reddish color. It is difficult to distinguish a colorless topaz from a diamond. Colored topazes are likely to fade on prolonged exposure to a strong light. The topaz occurs usually in the form of a crystal in such rocks as gneiss. Valuable gems are found in Maine, Connecticut, Colorado, Utah, and California, but chiefly in Mexico, Brazil, Japan, and Siberia. A topaz weighing 150 pounds in the rough was found near San Diego, California. It sold for $150. Cut and polished it produced a gem six inches in diameter, valued by experts at $10,000. See GEM.

Topeka, the capital of Kansas and the county seat of Shawnee County, is on the Kansas River and on the Chicago, Rock Island & Pacific, Atchison, Topeka & Santa Fe, Missouri Pacific, Leavenworth & Topeka and Union Pacific railroads, 67 miles west of Kansas City.

Topeka is a well planned, well paved and lighted city built on a sweep of prairie that is a valuable source of agricultural produce and live stock. The industrial establishments produce flour, dressed meats, woolen goods, boilers, creamery products and machine shop and foundry products. The headquarters of the Santa Fe Railroad are here.

Among numerous handsome buildings the most conspicuous is the capitol, situated in the center of an attractive bit of parking; the city, county and Federal buildings, Home for Aged Women, Gage and Central parks, hotels, Masonic Temple, College of the Sisters of Bethany, Washburn College, state insane asylum, state reform school, several hospitals and a large public library are also attractive features.

Topeka is one of the cities founded by the "free staters" after the passage of the Kansas Nebraska Bill; it was settled in 1854. In 1856 an anti-slavery convention was held here, a constitution was adopted and the Topeka government was established. This was later abolished by the Federal government. A city charter was secured in 1857, and the city became the state capital four years later. Population 1920, 50,022.

Toronto, Ontario, is the capital and largest city of the province and is the second city of the Dominion. It is on the north shore and near the western end of Lake Ontario, 334 miles northwest of Montreal. The city is built on a plain-like shore that rises gently from the lake front and terminates in a chain of hills that forms the most exclusive residential section. Toronto is served by almost all lines of lake steamers and by the Grand Trunk, Canadian Northern and Canadian Pacific railroads.

BUILDINGS, PARKS AND INSTITUTIONS. The most conspicuous of Toronto's many beautiful public buildings is the city hall, erected at a cost of $2,500,000; it is surmounted by a clock tower that rises 300 feet. The Royal Bank building, Union Station, Parliament building, General Hospital, Casa Loma, and many office buildings are also noteworthy.

Of the more than fifty parks in the city, the most notable are High Park, 335 acres; Exhibition Park, 235 acres, in which the

Canadian National Exhibition is held; Humber Boulevard; Riverdale Park, which has a zoological garden; Hanlon's Point and Scarborough Beach, which are attractive amusement parks.

The churches of Toronto are too numerous for complete enumeration, but Saint Paul's, Saint James Cathedral, Bond Street Congregational, Saint Michael's Cathedral, Metropolitan Methodist, Jarvin Street Baptist, Saint James and Saint Andrews, and Eaton Memorial Methodist deserve special mention.

Toronto maintains modern and edequate public school and public library systems, and has also a number of special and technical seats of learning. Of the latter the most important are the University of Toronto, the highest institution in the Dominion; McMaster University; Knox College; Victoria College; Upper Canada College; Trinity College; St. Andrews College; the Technical School; Wycliff College, and a number of commercial and private schools. The city also has an art school, an art museum, colleges of music and various historical and scientific collections.

Commerce. Toronto harbor is deep, landlocked and commodious; and when improvements now under construction are completed the harbor will accommodate 100 vessels of from 5,000 to 10,000 tons. Everything that will serve Toronto's commerce is here—wharves, warehouses, loading and unloading sheds, cranes and other harbor equipment. Toronto is the principal live stock market of Canada, and has a valuable trade in farm produce and in the produces of its industrial plants.

Industry. At the last census Toronto had 2,210 factories. Hydro-electric power is available for manufacture. The city is the home of branch factories of almost 200 American industries. From the manufactories in the city issue furniture, agricultural machinery and implements, clothing, gloves, furs, hats, bricks and building materials, mechanic's tools, musical instruments, harness and leather goods, flour, cereals, boots and shoes, electrical goods, automobiles, chemicals, hardware, jewelry, engines, boilers, brewery and distillery products, stationery, stoves, pianos, bicycles, ships and other articles too numerous to mention. Toronto is the printing and publishing center of the Dominion.

History. Toronto is an Indian name signifying "a place of meeting," and was probably given because the site of the city was an important meeting place for the tribes of this region. It was adopted by the French when they settled here in the seventeenth century as fur traders. British traders appeared and fought with the French for control of the territory along this part of the lake. The French controlled the Niagara River route, and to offset their influence the English built Fort Oswego. Then the French erected, on the site of the present Toronto, Fort Rouille, in 1749.

In 1794 Toronto was chosen as the site of the capital of Upper Canada, but the name of York was given it. During the War of 1812 the American forces took the city and burned a part of it. This part was rebuilt and the town increased in size; it was chartered as a city in 1834. The first mayor of Toronto was Willlam Lyon Mackenzie. The city suffered from fire in 1837 and in 1904, but its growth was not checked. In 1911 the inhabitants numbered 376,538; in 1921, 521,893.

Torpedo, a device designed to destroy enemy ships at sea. The modern or Whitehead torpedo which is used by practically all navies consists of a cigar-shaped steel shell from eighteen to twenty-two inches in diameter and from seventeen to twenty-two feet long. The torpedo has a conical shaped head and the rear tapers to a cylindrical tail, to which the propellers are attached. The interior is divided into three compartments—the head containing the explosives, the air chamber, containing air under a very high pressure, and the chamber in the after part of the shell, which contains the machinery for propelling the torpedo. There are two propellers, each operated by its own motor. The motors are driven by the compressed air from the air chamber and may be of the reciprocal type or the steam turbine type. A gyroscope keeps the torpedo on its course, but a recent invention by John Hays Hammond, Jr., makes possible the control of the course by electricity. The

details of this invention are a government secret.

The head of a large torpedo contains at least 250 pounds of moist gun cotton or its equivalent of T.N.T. A small projection called the war nose on the front of the head discharges the explosive when the torpedo strikes. The cost of a large torpedo is $8,000 or more.

A torpedo may be fired from above the water or from beneath the surface. Since the perfection of the submarine all torpedoes are fired by the second method. A speed of thirty miles an hour may be maintained for about six miles and for shorter distances a higher speed, fifty miles an hour, is possible. A torpedo seldom hits a target at a long distance, and submarines seldom fire at a ship more than a mile distant and a shorter distance is desirable. The force of the explosion will shatter the bottom or side of any warship.

The perfection of the submarine (which see) made the torpedo the "terror of the seas" during the World War until the appearance of large fleets of submarine destroyers checked this mode of warfare.

Torquemada, Thomas de (1420-1498), the first inquisitor-general of Castile and Leon. Torquemada was educated as a dominican prior. Although he did not found the inquisition he organized it and became its first administrator under Ferdinand and Isabella. Protestant writers are accustomed to heap infamy on Torquemada for the barbarous severity with which he administered his office. In forming judgment, however, certain conditions should be borne in mind. The torture was in common use in that age both in prisons and in court to extort information even from the innocent. The inquisition was directed largely toward the Jews, whose wealth the grandees of the court were eager to seize, and whom the Spaniards desired, for political and social reasons, to expel from the country. Taking into consideration the general cruelty of the times and the political motives which were intermingled with those of a religious nature, historians are disposed to say that the authority of the church was used as a cloak to carry out the wishes of a greedy court, and that even Torquemada, who must be held responsible for the cruelty, was no worse than others of his day.

Torrens System, a system of land registration under which the title to the land is guaranteed by the government to the registered owner. It differs from the system of registration of deeds in that it requires full investigation on the part of the registrar of the title to the land, and no such title can be registered until it is declared perfect. Under the other system the deeds are registered without examination as to their validity, and the registration is not a guarantee of title, but becomes merely notification to others of property exchange or a convenient method of determining titles to property on the part of owners. The aim of the Torrens System is to simplify the process of transfer of property and to do away with the need for frequent examinations of titles. A fee of about twenty-four dollars is required for registration. This system was devised by Sir Robert Torrens, and the use of it in Australia has gradually spread to Tasmania, British Columbia, Ontario, New Zealand, to parts of Europe, and to Massachusetts, Minnesota, and Illinois.

Torricelli. See BAROMETER.

Torrington, Conn., an industrial city in Litchfield County, is on the Naugatuck River and on the New York, New Haven & Hartford Railroad, 35 miles west of Hartford. There are numerous manufactories, producing gasoline engines, brass products, automobile accessories, machine tools, hardware, woolen goods and other commodities.

Notable features of Torrington are the Federal building, Hungerford Memorial Hospital, public library, Elizabeth Blake Fuessenich Playground, Coe Memorial Park and the public school buildings. The town was founded in 1737, but was not chartered until 1887. John Brown was born here. In 1920 the population was 22,055.

Torso. See SCULPTURE.

Tort, an ill-defined legal term for what the law recognizes as a civil wrong as distinguished from a crime. A definition

favored by some jurists is "a wrong independent of contract." Thus slander, negligence, etc., are torts. Some offences are punishable as crimes and at the same time involve a tort, the injured party being allowed redress for the latter and the offender being punished by the state for the former. Simply stated, then, tort is an offence against an individual; crime, an offence against the state.

The chief reason for the absence of a proper definition of tort is that as societies change, legal methods change with them; the tort of today may be the crime of tomorrow, and new relations between man and man are constantly arising. Tort is not a breach of contract and is not a crime, but rather an injury to the individual's body or feelings. The principal torts, besides those named above, are conversion, seduction, libel, nuisance, alienation of affection and trespass.

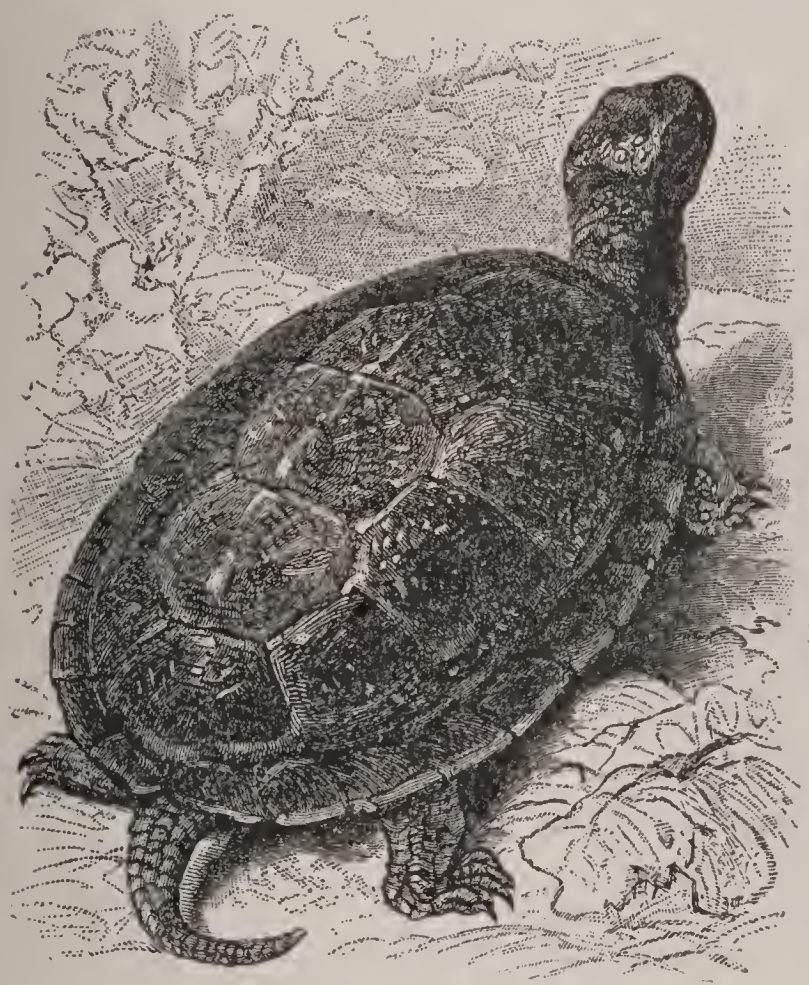
Tortoise, a large order of land and water reptiles, including the terrapins and turtles. In size and appearance the members of the order differ almost as much as the fishes; but they possess certain general characteristics. All have genuine backbones. The ribs have widened and grown together, uniting with the breastbone in such a way as to form a case or box of bone, open in front and rear. This case is called a shell. The upper part of the shell is called the carapace; the lower part is called the plastron. Most species are able to withdraw the head, tail, and the feet within the shelter of the shell. The various species are entirely without teeth, but they have strong, horny jaws with edges sharp enough to chisel off and cut up both vegetable and animal food. The tortoises, terrapins, and turtles all dig holes in the earth and deposit leathery eggs, leaving them to be hatched by the heat of the sun. There is great confusion in the common names applied to the different species. The mud-turtle is really a terrapin; the tortoiseshell of commerce is the carapace of a sea turtle, and so on. Authorities propose that the name tortoise be applied to dry land members of the order; terrapin to the pond, river, and swamp species; and turtle to those that frequent the seashore. This use of terms would clear up the situation.

The tortoises, then, are dry land animals. The toes are without web. The species wander about, morning and evening, lifting the shell well from the ground. They search for snails, earthworms, crayfish, grubs, and various fungi. They feed, also, on green plants. The tortoise is supposed to be the longest lived animal, exceeding even the elephant in age. It is believed that some have lived several hundred years. A giant tortoise, thought to be over 400 years old, died recently in the London Zoölogical Garden. He was brought from the Galapagos Islands in the eighteenth century, and was then regarded as over 200 years old. Drake, as he was called. lived on lettuce. He had the capacity of an ox. It lives chiefly on cacti and coarse grass. A similar tortoise inhabits the Seychelles Islands. A large specimen, known to be 250 years of age, was exhibited at the Louisiana Purchase Exposition held at St. Louis. It came from the Seychelles Islands east of Madagascar. The inhabitants held this venerable tortoise in high respect and were very unwilling to loan it. It was a high favorite at the fair. Children were permitted a ride on its back.

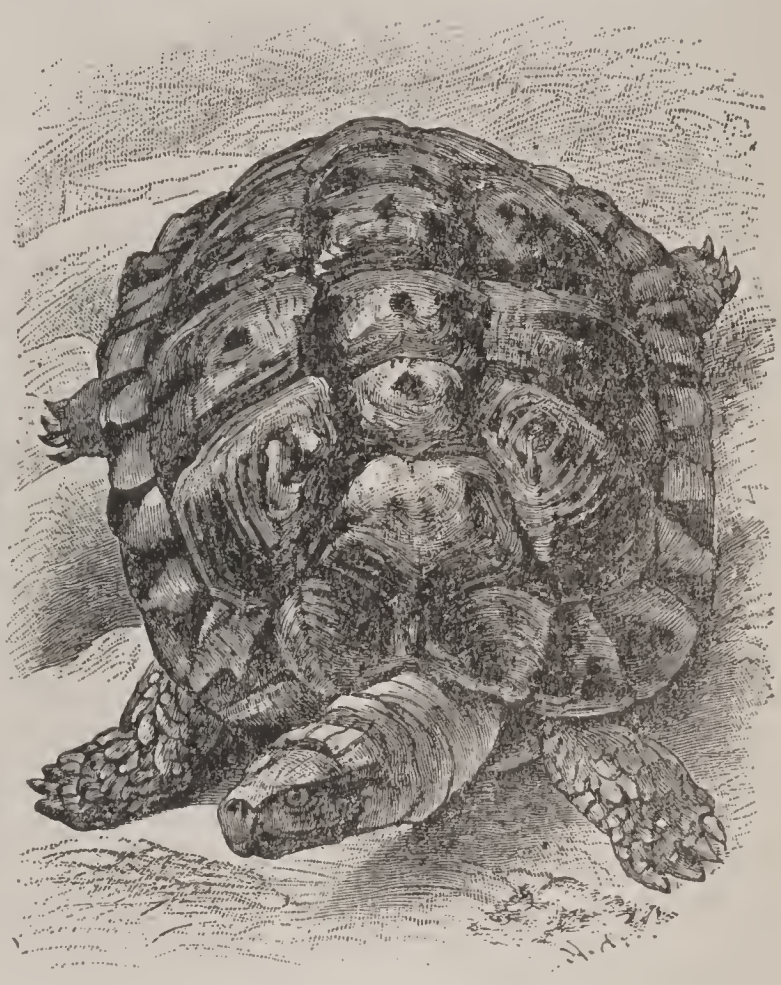
The largest American species is the gopher tortoise of the Gulf States. It weighs from two to fifteen pounds. It has a very heavy, strong shell. It takes its name from a habit of burrowing in the sandy soil of the pine forests which it inhabits. Still another species is the box tortoise. The front and rear ends of the plastron of the box tortoise are hinged to the center. When alarmed the box tortoise draws in its head and feet. It is able to pull up the front end and the rear end of the under shell like the drawbridge of a castle, completely closing each end of the box and excluding the claw of an enemy. Neither the raccoon nor any other natural enemy of the box tortoise is able to pull open the shell. At first sight this tortoise is hardly distinguishable from a terrapin, but it is never known to go near the water.

The tortoise is not unnoticed in literature. The reader will recall the dissatisfied tortoise who begged the eagle to teach him to fly. The eagle good naturedly carried the tortoise aloft and set him adrift, but the

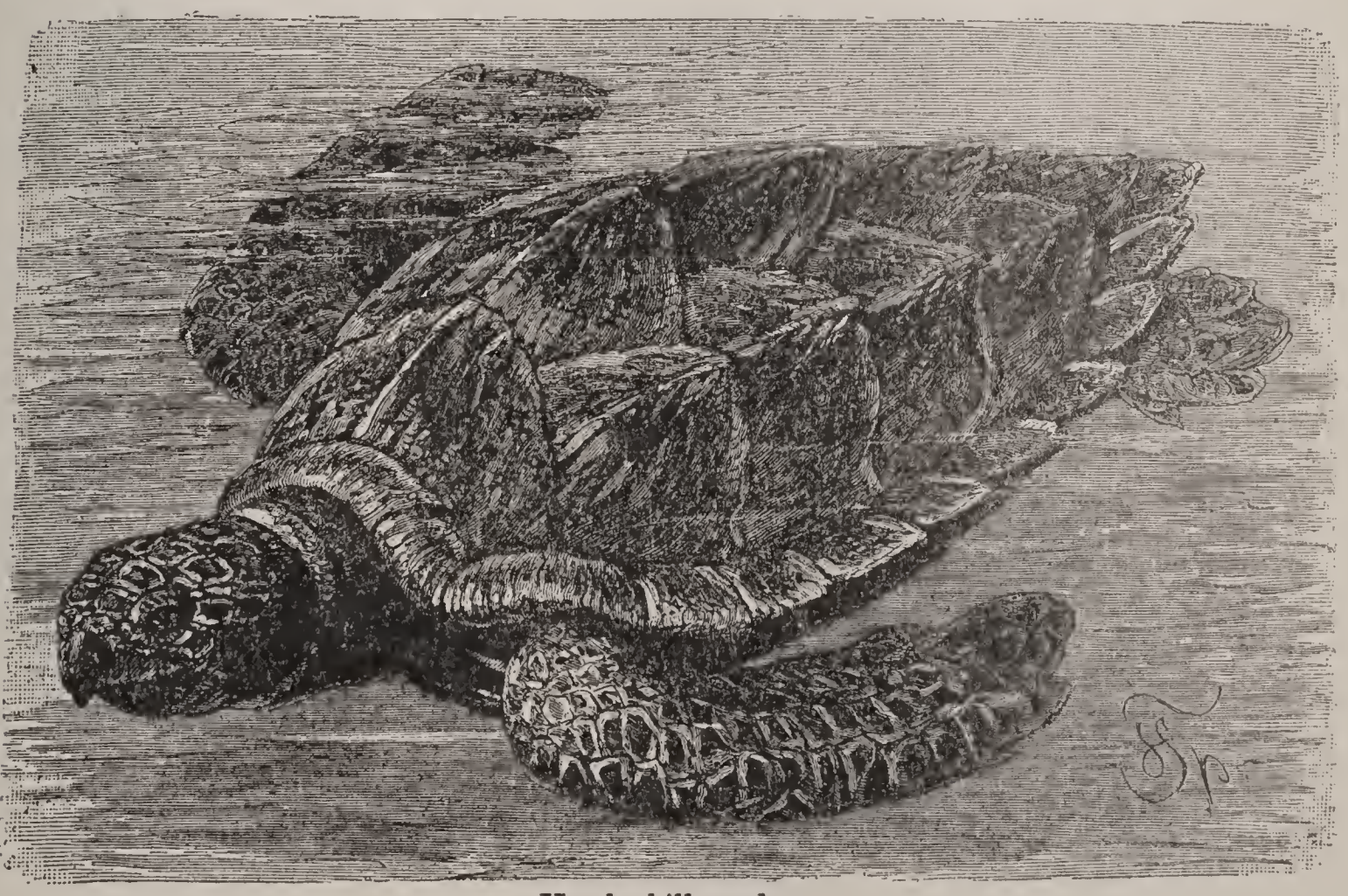
Big-headed terrapin.



Pond terrapin, mud turtle.



Greek tortoise.



Hawks-bill turtle.

tortoise came to his end on the rocks below. The fable of *The Hare and the Tortoise,* and how the slow tortoise won the race from his sleeping competitor, is also familiar.

The terrapins or "mud-turtles" are numerous. There are many species. Apparently they spend most of their time sitting on logs ready to slide off into the water. Most of them prefer ponds to running water. In midsummer they seek dry spots, sometimes a mile or two from water, in which to excavate pockets and deposit their eggs. In the autumn they burrow in the mud at the bottom of ponds and lie there like frogs all winter. One terrapin, about six inches in length, is known as the "musk-turtle" or "stink-pot," from the musky odor which it emits. It is able to draw the ends of the lower shell inward slightly, somewhat after the manner, only less so, of the box tortoise. Another well known species is the red-bellied terrapin or "slider." It has a reddish plastron, and is always ready to slide into the water. The shell is about a foot long and eight inches wide.

The most widely known of all the terrapins is the common pond terrapin or "mud-turtle." It is from six to eight inches in length. As compared with other species it is rather flat. The sections of the carapace are of a greenish black edged with yellow. The outer margin of the carapace is marked with bright red. The under shell is yellow and brown. The legs and tail are marked with red lines. The upper jaw is notched in front.

The diamond-backed terrapin, so called from the shape of the plates of the carapace, is an inhabitant of the salt sea marshes. It was found at one time anywhere along the coast from Massachusetts to Texas, but especially about Chesapeake Bay. It has a high reputation for soup, a fact which has almost caused its extermination. Specimens are now worth from five to ten dollars each in the restaurants of the large cities. Maryland has established a terrapin hatchery. It requires about eighteen years for a diamond-back to grow large enough for the table.

Another species is the alligator terrapin of Louisiana. The upper shell is covered with clumsy projections; the head is large and strong. It attains a weight of from forty to one hundred pounds. It is the largest of the terrapins. The so-called snapping turtle should be known as a snapping terrapin. It has its name from a way of snapping at its food. Both it and the alligator terrapin are accused of stealing young ducks from the surface of ponds. They are wicked, savage creatures, living largely on fish. The moss-back is a sluggish terrapin of inland ponds. It stirs about so little that its back actually becomes covered with a growth of moss. Unprogressive people are known sometimes as "moss-backs."

The soft-shelled terrapin is an inhabitant of the Mississippi and its branches. Both the upper and the lower shell are soft and leathery. The feet are palmated. The animal is an excellent swimmer. It is flat. The shell attains a length of sixteen inches. Large specimens of "soft-shell" weigh forty pounds. It deposits its eggs on sand bars at night; otherwise it is believed never to leave the water.

The turtle is a marine animal of a reptilian nature, closely allied to the tortoise. The turtle's legs are converted into flippers, a long pair in front and a shorter pair in the rear, with toes entirely covered by a skin sack. The bony case of a turtle is too small to allow head and flippers to be drawn entirely within. The turtle is a fine swimmer and lives in the ocean, going ashore only to lay eggs on hot sandy beaches. The turtle comes ashore at night with great caution, selects a spot some distance, it may be, from the water, digs a hole a foot or two deep, deposits fifty to two hundred eggs, one by one, in regular layers, scrapes the sand back into the hole, and smooths the surface so that the eggs cannot be located readily by enemies. She then goes off to sea, leaving her eggs to hatch in the hot sand. The little turtles find their own way out, which they do cheerfully and betake themselves to the ocean. The turtle lays from two to three times each season. The eggs have leathery, somewhat tough shells, and are from two to three inches in diameter. Some turtles feed on shellfish and other animal food. The flesh of such turtles is strong and useless for food. They are hunted for oil

only. Most kinds live on seaweed and have tender, well flavored flesh, fit for table use. Turtles' eggs are sought by the islanders for food.

The green turtle of the West Indies is sought for food. Turtle steaks and turtle eggs are esteemed great delicacies. The traditional London aldermanic dinner is introduced by green turtle soup. These turtles swim as far north as Great Britain and Long Island Sound, but Ascension Island is the locality most noted for green turtles. They attain a length of five to six feet and weigh from 200 to 600 pounds. They are taken sometimes with a slipnoose or harpoon when apparently asleep on the surface of the ocean, but chiefly by men who lie in wait for them when they come ashore to lay their eggs. The hunters then rush upon them and turn them over on their backs, where they lie helpless till their mates have been secured in similar fashion. The green turtle takes its name from the color of its fat.

The hawk's-bill turtle of the Red Sea and of tropical waters generally is so called from the shape of its mouth. This turtle is from two to five feet in length. It furnishes the tortoiseshell of commerce. The upper shell is composed of thirteen heavy overlapping plates, with the beautiful cloudy markings so valued in combs and other ornamental articles. Tortoiseshell becomes plastic under heat, and can be pressed flat or into curved molds. Pieces may be soldered together by a hot iron, or by means of heat, heavy pressure, and a glue made from filings of the shell. The largest plates are perhaps six by eighteen inches, and are an eighth of an inch thick. Tortoiseshell is worth several dollars a pound. It is imitated by celluloid.

The loggerhead turtle, found in American waters from Brazil to Cape Cod, attains a weight of 1,100 pounds. Some people claim to enjoy loggerhead steaks. Ordinarily it is useless for food, but it yields oil, and its shell serves a rude civilization for a number of purposes,—tubs, drinking troughs, and the like. It has immense, voracious jaws with which to crush oysters and other shellfish on which it feeds.

The leathery turtle is notable for a leathery covering in place of horny plates. It attains a weight of 800 pounds and has the habits and range of the loggerhead.

Tory, a member of the British political party opposed to the Whig. The origin of this party name is interesting. The term is Irish, meaning a pursuer, searcher, plunderer. During the reign of Charles II, tory was a common name for Irish robbers and outlaws who dwelt in the bogs. Later it was applied to the outlawed element of Ireland that upheld the cause of the Catholic Duke of York whom the Protestants of England desired to exclude from the throne. Later, when the duke came to the throne, the name was transferred to the court party and became attached to the great political organization that acted in opposition to the Whigs.

While no hard and fast line can be drawn, it may be said that the members of the Church of England were chiefly Tories, while the dissenters or independent elements generally were Whigs. Historically, the Tories are considered the party of the church and state. On the whole the Tory party has upheld the prerogatives of the crown and has stood by the privileges of the established church. The Conservative party is the successor of the Tory party.

Tory, Henry Marshall (1867-), a Canadian educator, was born at Greysboro, Nova Scotia, and was educated for the ministry. In 1889 he was ordained a Methodist clergyman, but retired four years later. From 1891 to 1897 he was lecturer on mathematics at McGill University; and professor of mathematics from 1897 to 1908. In the latter year Dr. Tory was made president of the newly established University of Alberta. He contributed many articles to scientific periodicals in Canada and England and published *A Manual of Laboratory Physics.*

Totem, among the Indians of North America, a natural object, usually an animal, assumed as the token or emblem of a clan or family. A representation of the totem served to designate the members of the clan, much as emblems are used by members of the various fraternal orders. The totem of the Indian was pricked in the skin or on the clothing and upon weapons of the chase, domestic utensils, etc. In a way the figure of the clan totem was an idol,

at least it is clear that it was regarded with reverence. The Indians of the Pacific coast set up totem poles, posts on which their totem was carved. A totem pole of this sort has been secured by the city of Seattle. Longfellow speaks of totem posts in *Hiawatha.*

> And they painted on the grave-posts—
> Each his own ancestral Totem,
> Each the symbol of his household;
> Figures of the Bear and Reindeer,
> Of the Turtle, Crane, and Beaver,
> Each inverted as a token
> That the owner was departed.

Toucan, to͞o′kăn, a family of birds allied to the parrot. There are a score of species in the forests of tropical South America. The foot is yoke-toed—two toes point forward; two backward. The larger species reach a length of twenty inches and all are brilliantly colored in scarlet, black, bronze, olive, cinnamon, orange, or green. The toucan is a ceaseless screamer. It is noticeable for an enormous saw-toothed, curved bill, which seems entirely too heavy for the body. It reaches a length of six inches in the large species, but it is really quite light and porous in structure. The toucan is an omnivorous eater, living on seeds, fish, small birds, reptiles, and insects, but chiefly on fleshy fruits. See HORNBILL.

Touch-me-not, known also as balsam, impatiens, and jewel-weed, a favorite garden flower. The touch-me-not is related to the wood-sorrel, but it grows from one to five feet high. The plant is transparent and full of water. The stems are branching and are crowded with leaves and white, red, or variegated flowers. One sepal is prolonged into a spur. The name touch-me-not comes from the impatient nature of the seed pod. If a ripe pod be touched it springs open surprisingly, flinging its seeds to some distance. Our garden flower is a native of southern Europe. There are in all 100 kinds, found chiefly in the East Indies. Two kinds grow wild in America, one with pale yellow flowers, sometimes spotted, and one with orange-colored flowers thickly spotted with brown. Both grow in rich, damp soil in shady ravines.

Touchstone, a clown in Shakespeare's *As You Like It.* Touchstone is a fool by profession, but he is a wise fool, and a favorite character. He mocks the evils and follies of court life, as they are suggested in contrast with the free life of the forest. He weds Audrey, the country maid.

> Touchstone is a rare fellow. He is a mixture of the ancient cynic philosopher, with the modern buffoon, and turns folly into wit and wit into folly, just as the fit takes him.—Hazlitt.

Tourgee, to͞or-zhā′, **Albion Winegar** (1838-1905), an American jurist and author. He was born at Williamsfield, Ohio. He was educated at the University of Rochester, New York. He enlisted as a soldier in the Civil War, but was wounded in the battle of Bull Run, and obtained consequently his discharge. He then studied law and was admitted to the bar at Painesville, Ohio. In 1862 he again entered military service. He began the practice of law in 1865 at Greensboro, North Carolina. His first novels, *A Fool's Errand* and *Figs and Thistles,* were published in 1879. These, as well as several later stories, had to do with reconstruction times in the South. They created wide interest and discussion. *Bricks Without Straw, An Appeal to Caesar,* and *Hot Ploughshares* are other titles.

Tournament. See CHIVALRY.

Tours, a city of France. It is situated on the left bank of the Loire about 120 miles southwest of Paris. The river is spanned by a notable bridge 1,423 feet long. The banks, like those of the Seine in Paris, are inclosed by a quay along which are handsome houses and stately promenades. There are manufactures of silks, ribbons, and woolen goods, rugs, chemicals, and leather. A large provincial trade is carried on in wheat, wine, honey, wax, dried fruits, hemp, and wool. The more pretentious buildings are the bishop's palace and the cathedral. The latter is celebrated for its domed exterior, a Gothic interior, and beautiful stained glass windows. The famous battle of Tours was fought near this city in 732. In this engagement Charles Martel defeated the Saracen invaders and drove them back towards Spain. Several church councils met at Tours. In 1870, when Paris was invested by the Germans, the seat of government was removed temporarily to Tours. The population in 1920 was 75,096.

Toussaint L'Ouverture, too′săn′ loo′-vĕr-tür′, a patriot of Haiti. He was a full-

blooded negro, the child of slaves. The details of his early life are unknown. In 1791 the Haitian negroes broke out into open revolt. Toussaint joined them, but not until he had exerted himself to secure the escape of the family of his old master. During the time of the French Republic, Haiti was a French possession. The leaders of the French Republic, recognizing his ability, placed him at the head of the negro troops in the island. Toussaint defended Haiti successfully against an invasion of the British, but, instead of remaining loyal to France, he declared the independence of the island. He framed a constitution under the provisions of which he was named president for life of the Republic of Haiti. Although a man of quiet habits and of controlled appetites, he deemed it necessary to maintain a court of considerable magnificence.

When Napoleon came into power, he sent a powerful force of soldiers to subdue the Haitian Republic. Toussaint showed himself a master of military strategy, but was overcome finally by overwhelming numbers. He took the oath of fidelity to France and retired to his estate, but later he was arrested on a charge of conspiring against the authority of France. He was sent to France in irons and died in prison. Napoleon has been charged with making away with him by means of poison, but there is no proof of the fact. The following quotation is from the pen of Wendell Phillips:

> You think me a fanatic, for you read history, not with your eyes, but with your prejudices. But fifty years hence, when Truth gets a hearing, the Muse of history will put Phocion for the Greek, Brutus for the Roman, Hampden for England, Fayette for France, choose Washington as the bright, consummate flower of our earlier civilization, then dipping her pen in the sunlight, will write in the clear blue, above them all, the name of the soldier, the statesman, the martyr, Toussaint L'Ouverture.

See HAITI.

Tower of London, an ancient fortress and state prison. It is an irregular pile of buildings surrounded by battlemented stone walls and a deep moat. It stands on the north bank of the Thames in the eastern part of the city, beyond the site of the ancient city walls. The moat surrounds a five-sided space of thirteen acres. The square keep, the center of the fortress, was built in the reign of William the Conqueror. The tower was originally a palace and a castle, but was converted early into a state prison,—the Bastille of England.

Many an object of royal fear or hatred, as well as many a criminal of high estate, was confined in the Tower. Sometimes the condemned were executed in the court, but more often they were taken forth to Tower Hill under guard. Thomas More, Anne Boleyn, Thomas Cromwell, Catherine Howard, Admiral Seymour, Lady Jane Grey and her husband, Sir John Eliot, the Earl of Essex, and many other illustrious prisoners who were beheaded by royal order lie buried in the Tower Chapel. It is one of the saddest spots on earth. The rooms in which these prisoners were confined are still shown. Among other prisoners held in the Tower for a longer or shorter length of time may be mentioned John Baliol, William Wallace, David Bruce, King John of France, Archbishop Cranmer, Princess Elizabeth, Sir Walter Raleigh, the Earl of Strafford, Archbishop Laud, and the Duke of Marlborough.

Visitors are admitted freely. One of the spots most likely to attract attention is the stairway under which the remains of the two young princes murdered by Richard III were found. Cases of antiquities contain armor, swords, maces, pikes, crossbows, longbows, battleaxes, and ancient firearms. Two brass cannon taken by General Wolfe at Quebec are shown.

The crown jewels or regalia of England are kept in a strong tower. There are magnificent crowns and circlets, studded with gems. The gold and the jewels in the collection are said to be worth $15,000,000.

See THAMES; LONDON.

Town Meeting, primarily, the business meeting of the voters of a New England town. As the word "town" is used in New England it means not necessarily a village or other thickly populated community, but a division of the county for local government corresponding to the township of some western states. A New England town many be partly urban and partly rural, or wholly one or the other; it is distinguished always by the democratic form of local government known as the

town meeting. This was established by the early Pilgrims and Puritans, whose first town meetings were both religious and civic assemblies. They might pass, for instance, a by-law deciding upon the arrangement of seats in the local church, side by side with one creating a town pound-master. All the town officers were elected at these assemblies and by-laws were passed for local government. Usually every man who was qualified to vote for governor and president might vote in a town meeting. Consequently, the town meeting is an example of absolute democratic government, where every voter has a direct voice in making the laws. The religious character of the town meeting was lost in the early nineteenth century, and it exists today purely for local government in New England, where it has quite overshadowed county government. A modified form of it has been tried in a number of western states, but it usually became representative rather than democratic.

Toy, a plaything for children. Over two hundred establishments in the United States are employed in the manufacture of toys and games. Dolls, doll houses, doll furniture, building blocks, kitchen furniture, hobbyhorses, toy gardening implements, drums, tin soldiers, warships, carts, locomotives, fire engines, trumpets, and other American toys are manufactured annually to the amount of $4,000,000. The toy-making industry is confined chiefly to the New England States and New York City. American merchants also import $3,000,000 worth of toys a year from Germany. American buyers go to Europe annually to make purchases before the holiday season. The chief centers of German toy making are Nuremberg and Sonneberg.

Nuremberg is the oldest European toy center known. It was a city of toy makers during the Middle Ages. It still leads the world in the manufacture of tin soldiers and other playthings made of metal. There are five large factories in Nuremberg. It is said that by combining their efforts, they would be able in a day's time to turn out an army of half a million fully equipped troops—horse, foot, and artillery—with ammunition and supply trains complete. The material used is a mixture of lead and tin.

Sonneberg is headquarters for wooden toys. Sonneberg proper is a city of about 20,000 inhabitants. It is surrounded by a score or more of villages and hamlets. Fir wood is obtained from the forest of Thuringia. Each village has its specialty. One makes hobbyhorses; another makes black bears and other animals in fur and feathers; another makes wooden guns. In another village rattles, wagons, and trumpets are made. Toy ships, cows, goats, and sheep are other specialities. Families have been in the toy-making business for centuries. All but children in the cradle work at toy making. Each cottage is a factory. It is said that the elephant, hippopotamus, pig, and rhinoceros now made in Sonneberg are precisely like the animals turned out in the day of Frederick the Great. The toy makers are satisfied with small earnings. Wooden dolls carved by hand are sold by the peasants to the dealer at less than half a cent apiece. A Noah's Ark with a dozen assorted animals brings the peasant toy maker about a cent and a half. Something like 75,000,000 papier-maché dolls are made yearly at Sonneberg.

Toynbee, toin′bē, **Arnold** (1852-1883), an English philosopher and social economist. He was born in London. At an early age he became interested in the conditions among the poor and instituted various reforms for their betterment. In his answer to Henry George's *Progress and Poverty* he presented views which revealed that he did not deserve the name of liberal socialist, which had been applied to him, but that he belonged decidedly to the conservative class. A university settlement, the first of its kind, was established in Whitechapel, London, in 1885, and in honor of his memory it was given the name of Toynbee Hall. The *Industrial Revolution* is a collection of his works and was published the year after his death.

Trade-mark, a mark placed on manufactured goods to distinguish the productions of one manufacturer from those of another. It identifies their origin and guarantees to the purchaser careful selection of goods, as well as purity of material, according to the best skill of the holder of the mark. A proper trade-mark is either a word, or words, or it may be a symbol,

or picture. It must be an invented work, and it cannot merely describe the article, for that would incur monopoly of manufacture or sale of the goods. The mark must convey a true impression of the special distinguishing nature of the article and its origin. By act of Congress trademarks can be registered with the government at a fee of ten dollars. The provision for protection under state laws dates back to April 1, 1905.

Trade Schools. See INDUSTRIAL SCHOOLS.

Trade Union, in economics, an organization of wage earners engaged in the same trade, occupation, or calling. Trade is here used in the mechanical sense, as in a carpenter by trade, the trade of shoemaking, working at a trade, etc. The term has no reference to trade in the mercantile sense, as the oyster trade or holiday trade. On the other hand, wage earners, as clerks, conductors, firemen, and others, not working at a trade, are competent to organize a trade union. Mixed organizations composed of wage earners of different occupations are designated as labor unions. The distinction between a union based on a trade and a union based on labor is logical. Labor leaders regard a labor union rather as a catch-all, desirable only in case there are not enough of a trade to reorganize regular trade unions.

Trade unions are as old as the Temple of Solomon. Organizations of skilled workmen were known to the ancients. Despite the efforts of rulers and employers to prevent trade unions, it may be said they have been and are prevalent to the present day wherever wage earners have been drawn together in large numbers by building, manufacturing, mining, quarrying, and other lines of industry. In a few countries the trade union movement has a rival in the industrial union movement, though as yet industrial unions are few and for the most part powerless.

UNITED STATES. The American trade union movement began as soon as sharp definition of workers into trades made it possible to say of the worker that he followed one trade or another. Necessarily, then, the first American trade unions appeared on the north Atlantic Coast; the trend westward kept pace with the general industrial expansion. After winning many industrial battles, it was seen that the unions were in need of greater unification. The first efforts at unification were made by such organizations as the National Labor Union and the Knights of Labor—loose-knit organizations with no clearly defined policies. Later, in 1881, the American Federation of Labor (A. F. of L.), was founded. In its constitution this organization gives a statement of its aims:

(1) The encouragement and formation of local trades and labor unions, and the closer federation and combination of such bodies, to secure legislation in the interest of the working masses.

(2) The establishment of national and international trade unions, based upon a strict recognition of the autonomy of each trade.

(3) An American Federation of all national and international trade unions, to assist each other, etc.

(4) To aid and encourage the labor press of America.

The Federation grew rapidly, changing a few details of organization from time to time. Its policy is determined at an open convention held somewhere in the United States each year. Not all American trade unions are affiliated with the Federation, which had, in round numbers 4,100,000 members in 1920. In the same year the railway brotherhoods had more than 400,000 members; the Amalgamated Clothing Workers had 200,000; the Amalgamated Textile Workers 40,000; and some 50,000 other trade unionists were affiliated with other independent organizations.

FOREIGN. Because of the earlier industrial expansion of the central and southern European countries, the trade union movement in those countries is older than the American movement; Asiatic trade unions, on the other hand, are of more recent origin than the American unions.

Great Britain. The British trade unions grew out of the ancient guilds, and the British unions have grown very rapidly and have won many valuable concessions for their members; in 1910 the trade unions of Great Britain had 2,397,821 members; in 1917 the 5,000,000 mark was passed; and

in 1918 the total membership was 8,044,000.

Canada. The membership of Canadian trade unions increases yearly, and the trade alliances are rapidly gaining in power. An interesting recent development of the Canadian movement is the organization known as the One Big Union, which in 1920 had approximately 40,000 members. The total Canadian membership was about 379,000 in that year.

General. In the following table are given the post-bellum membership figures of extra-American trade unions not mentioned above:

Austria	928,146
Belgium	670,000
Bulgaria	28,000
Czecho-Slovakia	740,000
Denmark	357,390
Esthonia	30,000
Finland	55,000
France	1,500,000
Germany	9,624,600
Greece	60,000
Holland	570,000
Hungary	215,000
Italy	2,250,000
Jugoslavia	250,000
Latavia	25,000
Luxembourg	27,000
Norway	150,000
Poland	948,000
Portugal	100,000
Rumania	200,000
Russia	5,222,000
Spain	1,100,000
Sweden	281,000
Switzerland	225,000
Argentina	1,100,000
Australia & New Zealand	700,000
Chile	20,000
Mexico	500,000
Peru	25,000
South Africa	60,000

The International Federation of Trade Unions, with headquarters in Amsterdam, Holland, is an organization of the leading national trade union bodies of the countries holding membership. In 1921 the total membership of this great organization was about 24,000,000. Its organization is loose-knit and it does not attempt to exercise control of the national affairs of any affiliated body. Its objects are the promotion of the interests of affiliated organizations, the provision of funds for purposes laid down in its rules, the prevention of international "scabbing" and the promotion of concerted action on matters of trade union interest.

Trade Winds. See WINDS.

Trafalgar, traf-al-gär′, a promontory on the southern coast of Spain, projecting into the Atlantic between Cadiz and the Strait of Gibraltar. It is marked by a lighthouse. The locality is famous for the naval battle of Trafalgar fought off the coast October 21, 1805. Nelson, in command of a British fleet of twenty-seven ships and four frigates, won a notable victory over a combined French and Spanish fleet of thirty-three ships and five frigates. The allies lost nineteen ships. Nelson was killed, the Spanish admiral was killed, and the French admiral was taken prisoner. The loss of the fleet was a severe blow to Napoleon and put an end to plans for a French invasion of England. See NELSON.

Tragacanth, a mucilaginous substance or gum obtained from certain spiny shrubs of Asia Minor and adjacent regions. These plants belong to the genus *astragalus.* Unlike other gums, tragacanth exudes not from sap or the bark but bursts forth from the pith, forming threads and flakes which may be gathered from the branchlets. Gum tragacanth is odorless and nearly tasteless. Disintegrated in water, for it will not dissolve, it forms desirable but expensive mucilage. It is used by pharmacists in the manufacture of pills and by manufacturers to size crapes and calicoes. The bookbinder uses the gum in marbling books.

Tragedy, that form of drama which represents the sad or terrible phases of human life and character. In order that a dramatic composition may deserve the name of tragedy, certain requirements are necessary. In form, the production must be poetical; in subject it must present events of weight and importance. The style must be lofty and finished; the movement stately, the diction grave and dignified. There should be unity of action, and the outcome, or catastrophe, as it is usually called, must be disastrous. Unity of action requires that every incident, however trifling, must be shown to be a part of the cause of the final catastrophe, or a part of the catastrophe itself.

Tragedy, like comedy, had its origin in the festivals held among the ancient Greeks in honor of Bacchus or Dionysus. Comedy

took its rise from the jovial songs sung by the *comus* or procession. Tragedy grew out of the *dithyramb,* a choral song sung about the altar of Bacchus to celebrate his birth, and, perhaps, his adventures. Arion gave this song a definite shape by writing regular poems and arranging music suited to them. They were called tragedies, that is, tragic songs or goat-songs, probably because the singers wore goatskins to represent satyrs. Another explanation of the name is that a goat was offered on the altar to Bacchus as an appropriate sacrifice to the god of wine since the goat is a destroyer of vines.

The next step in the development of Greek tragedy was taken by the rhapsodes. These were wandering minstrels who recited poetry with or without musical accompaniment. The different ballads which go to make up the *Iliad* and the *Odyssey* were spread abroad by the rhapsodes. Thespis is given the credit for introducing a representative of these rhapsodes into the chorus or "tragedies" sung at the Dionysian festival, about 535 B. C. The rhapsode addressed his recitations to the leader of the chorus, thus carrying on a sort of dialogue. The chorus stood around the leader on the steps of the Bacchic altar, while the "actor," a rhapsode, stood on a table. This is the real beginning of dramatic tragedy. For the further development of tragedy the reader is referred to the article on DRAMA.

The first English tragedy was *Gorboduc* or *Ferrex and Porrex* by Thomas Sackville. This production was after the form of classical tragedy. It lacks in spirit, feeling, and imagination, but is of interest as the first English tragedy. Welsh says:

> Thenceforward the drama makes rapid proggress, passing from youth to a splendid maturity with enormous strides, and extending in a single generation over all the provinces of history, imagination, and fancy, with that breadth of anticipation and intoxication of heart which the ardent soul may experience, when from being a child it has become a man and feels a new-glowing joy shoot through nerve and vein. Expanding with the growing taste, it quits the Palace, the Inns, the Universities, where it is compressed, and creates in 1576 a public theater and a national audience. Before the end of the century, eleven theaters and nearly two hundred dramas attest the absorbing passion.

Tragedy is the highest form of the poetic art. A list of the world's great tragedies is not long. Many critics regard Sophocles as the greatest of tragedians and place the *Oedipus Tyrannus* at the "very summit of Greek tragic art." *Prometheus Bound* of Aeschylus, Goethe's *Faust,* and four plays of Shakespeare, *Hamlet, Othello, Macbeth,* and *King Lear,* may be considered great tragedies.

> Tragedy is poetry in its deepest earnest. Comedy is poetry in unlimited jest.—Coleridge.

Tragi-Comedy, a species of drama in which the tragic and comic elements are blended. The outcome of tragi-comedy is usually happy. Shakespeare's *Measure for Measure* is a species of this class of drama. See DRAMA; COMEDY; TRAGEDY.

Trajan (53-117 A. D.), a noted emperor of Rome. He was born in Seville, Spain. He was the son of a Roman commander. He distinguished himself in various campaigns in Parthia and on the Rhine. He thus attracted the attention of the Emperor Nerva who adopted him and made him his successor. Trajan came to the throne 78 A. D. Under Trajan the Empire of Rome reached its utmost limits. Trajan's Wall, a fortified double rampart, was built from a point on the Danube to the Black Sea, thirty-seven miles away. To commemorate his eastern victories, Trajan erected an ornate column in Rome. It still stands 117 feet high. It is ornamented—wrapped—with a spiral bas-relief representing the emperor's military exploits. Trajan's reign was noted for tranquility, the building of roads, the security of property, and for religious tolerance. Special provision was made for poor children. He died in Cilicia and was succeeded by Hadrian.

Transcendentalism in America, a reactionary movement from the materialism of the philosophy and theology of the eighteenth century. The movement and the term transcendental owe their origin to the German philosopher, Kant. His followers Fichte, Hegel, and Schelling, who are grouped frequently under the name of idealistic philosophers, had great influence in England through Carlyle and Coleridge. This movement extended to New England, and in 1837, at Harvard, the "Symposium," or "Transcendental Club," under the leadership of Emerson, was organized. The

views of the transcendentalists are too abstruse to be set forth briefly. We may say that they believed the study of the processes of thought to be the highest form of activity, and to lead ultimately to the principles governing the real world. They believed, with Schelling, that the highest truths come through intuition and not by logical reasoning or physical science.

Transcendentalism had its influence upon thought, upon religion, laws, institutions, and literature. As regards social life, its aim—at least the aim of many of its adherents — was reformatory. The "Brook Farm" experiment, with the visionary Bronson Alcott at its head, was a result of this movement. Emerson said of it, "And if they eat clouds and drink wind, they have not been without service to the race of man." Besides Emerson, George Ripley, Theodore Parker, Margaret Fuller, James Freeman Clarke, William H. Channing, Henry Thoreau, and Bronson Alcott are among those identified with the transcendental movement. A necessarily transient movement, the influence of transcendentalism upon literature has been its most enduring result. Through its chief representative, Emerson, it has stood for optimism, for ideality, for spirituality, for the general uplift of humanity as well as for independence and freedom.

See KANT; EMERSON; ALCOTT; BROOK FARM.

Transcona, Manitoba, is six miles east of Winnipeg, on the Canadian Pacific, Transcontinental and Canadian Northern railroads. The Transcontinental has a large round house and building and repair shops here, and there are also manufactories of chemicals, tar, paving blocks, lumber and foundry and machine shop products. The city trades in dairy products and cereals.

There are three public schools, three parks, an attractive municipal building and a theater. The water plant is the property of the municipality. In 1921 Transcona had 4,185 residents.

Transformer. See INDUCTION.

Transit, he passage of a heavenly body across the surface of another larger body, or over an arbitrary point. A planet may pass over the disk of the sun, or a satellite may make a transit of the planet around which it revolves. The time for the transit can be determined and the predictions are recorded in the astronomical ephemeris. The most frequent transits recorded are those of Venus and Mercury and of the satellites of Jupiter, the first-named planets being the only ones that have orbits lying within the orbit of the earth. It was formerly believed that transits were one of the best means for measuring the distance between the earth and the sun, but while this proved generally unsatisfactory in the case of Venus, they have, nevertheless, been an important means of determining the position of this planet. See MERCURY; VENUS.

Transmigration, or **Metempsychosis,** the doctrine of the passage of the soul after death into another body, human or otherwise. Herodotus is our authority for the Egyptian belief that at death the soul of man, being immortal, enters the body of some creature born to receive it, and that, after passing from animal to animal on sea, in air, and on land for 1,000 years, the soul returns to a human being again. It is thought that the Egyptian custom of embalming cats, crocodiles, and other animals had its origin in the belief that they had sheltered human souls. The doctrine may be traced among the Buddhists and Brahmans of India. The latter held that the purified soul finally returns to its origin — God. The doctrine of transmigration was taught by the Greek Pythagoras. Allusions are found to it in the writings of Cicero, of Virgil, and of Ovid. Modern writers have advanced similar views. Notably the theosophists of modern times announce, as a fundamental doctrine, a belief in successive "reincarnation."

Transpiration, in physics and chemistry, the passage of gaseous or liquid fluids through porous membranes or capillary tubes. A viscid fluid passes slowly through a tube, and the rate of transpiration is also determined by the temperature of the liquid, water of a high temperature passing more rapidly than when at a low degree. Other laws governing transpiration are still not fully determined. In plants transpira-

tion is evaporation. This loss of water is partly prevented by waterproof cells in the outer tissues of the plants, and the amount varies according to their structure, age, and external conditions. A loss of moisture in the plant occurs whenever the surrounding air does not contain moisture sufficient to its capacity, provided this moisture can be supplied by the plant.

Trans-Siberian Railway, a railway system of Russia extending eastward to the Pacific coast. This road was constructed for military purposes, in other words, to hold Siberia and, if possible, to acquire new territory at the expense of Korea and China. Before undertaking the enterprise, Russian commissioners studied the railway systems of the world, including those of North America. The Italian workmen who built the St. Gothard tunnel were transported in a body to Russia.

The work was begun at Moscow as early as 1870. The Volga was bridged in 1880-1891. The eastward extension of the railroad began in dead earnest. One of the greatest obstacles to the progress of the road was Lake Baikal. For some years it was passed by means of a steam ferry in the summer time and by a track laid on the ice in winter. A detour was finally built around the south side of the lake at a cost of $15,000,000.

At Harbin, Manchuria, the line divided, one branch going southward to Port Arthur, the other continuing eastward to Vladivostok. At the conclusion of the war with Japan the southern branch passed out of the control of Russia. The entire system cost Russia more than $200,000,000. In recent years the rolling stock has been improved and the passenger trains approach western luxuriousness.

See BAIKAL; KOREA; HARBIN; PORT ARTHUR; MANCHURIA.

Transvaal, a state of the Union of South Africa. The name is Dutch for "across the Vaal," the Vaal being a branch of the Orange River. The Transvaal was settled by boers who trekked northward from Cape Colony, 1836-37. In 1902 the British government "deemed it wise" to assume the administration, etc. The colony, as at present constituted, is of irregular shape. It extends from the Vaal River to the Limpopo, and is cut off from the Indian Ocean by the Portuguese possessions. The surface is, in general, an elevated plateau from 3,500 to 5,000 feet above sea level. The Drakenberg Mountains rise to an altitude of 8,725 feet. The basic rocks are granite and slate overlaid with sandstone and, later, slates and conglomerates. The Transvaal is rich in mines. Mining is accordingly the chief occupation. The annual output of coal is about 2,085,837 tons; gold and silver to the value of $3,800,000,000 are exported yearly. Diamonds are washed to the value of from $30,000,000 to $40,000,000 a year. There are mines of copper, tin, lead, and antimony, and quarries of valuable building stone. Asbestos is found, brick are burned, and excellent lime is obtained from the limestone. The climate is dry.

Wild beasts have been exterminated in the settled sections. Stock-raising outranks agriculture. The farmers possess 3,250,000 sheep, half as many cattle, and over 70,000 horses. Swine prosper. Ostriches are reared for feathers. About 2,000,000 acres are under plow. The area of the Transvaal is 110,450 square miles. The population in 1920 was reported at 2,085,837, of whom over a million were natives, Kaffirs, Basutos, Bechuanas, etc. Some 31,000 Chinese, brought in at an early date to build railroads and work mines, have been sent home. The government feels that the colored problem is quite sufficient without the further admission of Asiatics.

Pretoria, the capital, has a population of 73,770; Johannesburg, the largest city, 284,191. The government is in the hands of a governor, a responsible ministry, and a legislative assembly. The Europeans are largely Protestant. Ninety per cent of the natives are primitive heathen. There are 1,019 schools for white children and 420 for colored. Although the Boers are the predominant whites, English is the official language of the school. There is a police force consisting of 2,000 white officers and 500 natives. The yearly exports are valued at $200,000,000; imports $150,000,000. The annual colonial expenditure is about $10,000,000. There are some 550 postoffices with a complete system of postal savings banks. The telephone and tele-

graph lines in the Transvaal are owned by the public.

Treasure-Trove, trĕzh′ŭr-trōv, in English law, any treasure, as coin, gold, silver, plate, jewelery, or gems, found hidden away without an apparent owner. The word trove means found. The English laws require the finder to deliver treasure-trove to the proper officer for the use of the crown. In case the finder conceals the treasure, or neglects to report it, he is subject to arrest and punishment for theft. In practice, however, the English courts are accustomed to award treasure of this sort to the finder. In the United States treasure found hidden belongs to the owner of the land. If the owner of the land be unknown the treasure belongs to the finder. See KIDD.

Treasury, Department of, the executive department of the United States government which has control of the financial affairs of the nation. It is the duty of the Department to collect all taxes levied by Congress—income taxes, custom duties and internal revenue fees. It is likewise the duty of the Department to disburse the money collected.

It has charge of the minting of coins and the printing of paper-money and postage and other revenue stamps. The Department is also required to protect the people from counterfeiters, and to enforce the revenue laws and quarantine regulations and to supervise the construction of all buildings of the United States and to maintain such buildings in good condition. The auditing division audits the accounts of all other executive departments of the government and inspects all national banks.

The Secretary of the Treasury, appointed by the President, is at the head of the Department. He is aided by an under secretary and three assistant secretaries. Other important officials include the Comptroller of the Currency, Comptroller of the Treasury, Treasurer of the United States, Commissioner of Internal Revenue, Director of the Mint, the Director of the Bureau of Budget, Solicitor of the Treasury, Captain Commandant of the Coast Guard, Surgeon-General of the Public Health Bureau, Director of the Bureau of Engraving and Printing and Chief of the Division of Secret Service. Members of the Farm Loan Bureau and of the Federal Reserve Board are also officials of the Treasury Department.

Treaty, trē′ty, an agreement between nations. A treaty may be a contract to do, or a contract to leave undone, or both. In absolute monarchies the power of making treaties is vested in the sovereign. In constitutional monarchies treaty-making is a function of a cabinet or minister subject, in a varying degree, to parliamentary ratification. In the United States the president is authorized to make treaties, which, however, must be ratified by two-thirds of the Senate in order to become binding on the nation. The various agreements made by the government with Indian nations have been about 350. These so-called Indian treaties have involved usually the cession of lands by the Indians and the payment of lump sums or annuities by the United States. The first foreign treaty entered into by the United States after the treaty of peace with Great Britain was made with Algiers, September 5, 1795. It provided for peace and friendship between the two nations, in consideration of which the United States agreed to pay the bey an annual sum. It was superseded by a similar treaty twenty years later, in which payment was abolished. Three or four hundred treaties have been completed since. They relate to such subjects as boundaries, the privileges of trading, and the return of fugitive criminals. Arrangements of the latter sort, known as extradition treaties, have been entered into with all the civilized nations of the world. We give up criminals to other nations and they permit us to arrest and take home ours. A proper proof is, of course, requisite in each case. Among the offenses covered by these treaties are murder, kidnaping, bigamy, arson, rape, forgery, counterfeiting, embezzlement, larceny, burglary, highway robbery, theft of horses, fraud, receiving stolen goods, perjury, slave trading, etc. Our treaties for the return of criminals vary greatly with different countries. Mexico and Brazil, for instance, are the only countries with which we have extradition treaties covering bribery. See HAGUE TRIBUNAL; ARBITRATION; EXTRADITION.

FOLIAGE AND FRUIT OF COMMON TREES

Tree, the largest member of the plant family, distinguished from a bush or shrub, chiefly by its greater size and by having a single stem, the trunk, or bole. Broadly classified, trees are of two kinds, deciduous and evergreen; deciduous trees are leafless for a part of the year, while evergreens put forth new leaves before the old ones fall. The oak, maple, poplar. catalpa, etc., are deciduous; the hemlock, pine, fir, etc., are evergreen.

Two general forms among trees are recognized. Trees of one form rise to the full height with no splitting of the bole, as the pine; trees of the other form rise ten, twenty or thirty feet and then separate into two or more large stems, as, for a good example, the elm.

Trees differ greatly in size and in rapidity of growth, and differ also as to maximum age; but in all trees the age may be determined by counting the rings on a lateral cut of the trunk or of a limb. Each year a new ring appears, but after the tree reaches maturity the rings are narrower. Some trees live to be hundreds of years old; others live two thousand or more years. A cottonwood tree attains to a diameter of 18 inches in from 25 to 35 years; a chestnut tree requires from 65 to 75 years to reach this size; white fir does not reach 18 inches until 120 or 130 years have elapsed; and a beech tree does not attain to this dimension under 185 years. The great pines and redwoods of the western and northwestern United States frequently reach a height of 300 or 400 feet.

Trees that grow with a branching bole have much larger root systems than have those that rise as a single stem. The latter are, in general, conical in shape; but the former are more wide spreading and rounded, as a large oak or maple. The tree with a large top catches more wind, and for that reason would be easily blown over if it had not a wide expanse of roots to support it.

Until the opening of the twentieth century the finest trees of the United States were unrestrainedly cut down and sawn into lumber; but when it became apparent that the country would soon be deforested if unregulated lumbering continued, steps were taken by many states and by the national government to conserve what of our forests remained and to reforest the denuded areas. See FOREST AND FOREST SERVICE.

Tree, Sir Herbert Beerbohm (1853-1917), a distinguished English actor and theatrical manager. He was born in London, and made his professional debut there in 1877 in *Grimaldi.* His first real success came in 1884, when he played so well the part of the Rev. Robert Spalding in *The Private Secretary.* In 1887, Sir Herbert became manager of the Comedy Theater, London, where he successfully produced *The Red Lamp.* Between 1884 and 1887, he won fame for his work in *Called Back,* and in *Jim, The Penman.* In 1887 he also took charge of the Haymarket Theater, London, which he managed until 1896. In the year following, Sir Herbert became manager of Her Majesty's Theater, London, and opened with *The Seats of The Mighty.* At the same theater, he later gave *The Musketeers, The Last of the Dandies, Ulysses, Herod, Oliver Twist* and *The Beloved Vagabond.* But though he was successful in all the plays named, Sir Herbert won his greatest fame for his elaborate productions of the plays of Shakespeare, in most of which he played leading parts. He was knighted by King Edward VII in 1909.

Trent Affair, an episode of the American Civil War. In 1861 John Slidell and J. M. Mason were sent by the Confederate government as commissioners to France and Great Britain respectively. They ran the blockade successfully to Havana, and took passage for Liverpool on the British merchantman, the Trent. November 8, Captain Wilkes of the United States ship San Jacinta stopped the Trent in the old Bahama channel. He removed Mason and Slidell and took them to Boston as prisoners. The British minister at Washington, though kindly disposed toward the Federal cause, made an immediate and peremptory demand for their release. The Federal government desired to detain these prisoners, but could not afford to risk hostilities with Great Britain. Mason and Slidell were surrendered to the British authorities.

Moreover, the removal of the commissioners from the British ship was clearly a violation of international law. Prior to the war of 1812 the British government insisted on searching American ships and in removing British subjects who might be desired for the British navy. The government of the United States protested against the right of search and could not now refuse to live up to a principle of international law on which it had formerly insisted strenuously. The newspapers of the day assailed President Lincoln and his advisors bitterly for yielding to the British demand; but time has shown that the demand was proper, and compliance, however disagreeable, the only thing to do.

Trenton, the capital of New Jersey, and the county seat of Mercer County, is located on the Delaware River at the head of tidewater navigation and on the Delaware and Raritan Canal. The Pennsylvania and the Philadelphia & Reading Railroads and several interurban lines furnish ample means for freight and passenger transportation.

The city is well laid out with broad, well paved and shaded streets and has many attractive public and semi-public buildings. Among these, the capitol is the most conspicuous; others are: the public library, very modern Y. M. C. A., Y. W. C. A., Y. M. H. A., and K. of C. buildings, state penitentiary, state normal school, state school for the deaf; city, county and federal buildings; school of industrial arts; an armory and the stone barracks erected during the French and Indian Wars. There are two large parks, one of them containing a zoological garden.

The pride of the city is in its public schools. Many millions of dollars are now being spent in the construction of several modern school buildings, each being located on a tract of land from five to thirty-five acres.

The U. S. census of manufactures lists 96 diversified industries having a total of 400 industrial plants with an invested capital of $108,000,000 and annually producing $125,000,000 worth of finished products. Trenton ranks first in pottery, second in rubber and foremost in wire and steel cable amongst America's cities. Annual wages paid to its 40,000 employes exceed $40,000,000.

Amongst its leading manufactures are: pottery, automobile tires, rubber goods, wire, machinery, structural steel, linoleum, aerial tramways, automobiles, automobile bodies, anvils, asbestos fabrics, automatic stokers, battery jars, bedding and spring mattresses, bricks, brooms, cables, candies, cigars, castings, chains, clothing, cotton duck, crucibles, desks, dies, doors, sashes and blinds, electrical instruments, fertilizers, fire escapes, flour, furniture, hardware, hosiery, incandescent lamps, inks, lead refining, millboard, metal products, oilcloth, overalls, boxes, plumbers' supplies, pumps, radiators, raincoats, refrigerators, silk and woolen yarns, shoe dressing, steam turbines, steel barges, tile, tools, vises, watches, wire cloth, woolen cloth and many other things.

Trenton was settled about 1676 and was incorporated as a borough in 1746. In 1775 the provincial congress of New Jersey met here. Here, December, 1776, Washington crossed the Delaware and won the Battle of Trenton which was the turning point in the Revolutionary War. In 1920, Trenton had 119,289 inhabitants.

Trepang, the dried body of a species of sea-cucumber. See SEA-CUCUMBER.

Trepanning, a well known surgical operation. It consists in the removal of a portion of the skull to relieve pressure on the brain. The operation is performed usually with an instrument known as the trepan, crown saw, or trephine. The crown saw consists essentially of a cylinder fastened on a central shaft or pin. The end of the cylinder which is to perform the work is provided with sharp, saw-like teeth. The central pin holds the instrument in position. When twirled between the fingers or driven by power it cuts out a circular piece of bone neatly, making an orifice varying according to the instrument from the size of a dime to that of a silver dollar. If performed with care the wound heals again and no evil results follow. The term is to be distinguished from trapan, sometimes, but less properly, spelled trepan, to take in a trap or snare.

Treves, trēvz, a city of Prussia. It is situated on a plain on the right bank of

the Moselle, surrounded by vine-clad hills and wooded heights. It is said to be the oldest city in Germany. It was the capital of the Belgic Gauls, known as Treviri. The Romans made Treves an important center. During the fourth century it was at times the residence of the Roman emperors. No other city north of the Alps contains so many remains of the Roman period. A brick basilica dates from the reign of Constantine; an amphitheater, still in good preservation and once capable of seating 30,000 spectators, dates from the reign of Trajan or Hadrian. It is now surrounded by vineyards. It was here that Constantine butchered captives, or turned them loose to be torn by wild beasts for the amusement of the populace. The city is still surrounded by strong walls of red sandstone, fortified by numerous picturesque towers. A huge gateway, three stories in height, 115 feet wide, and 29 feet deep, still stands. It is made of huge blocks of sandstone fastened together with iron or copper clamps instead of mortar. Other remains of Roman times are hardly less imposing. The cathedral, consisting in part of an older edifice by the Emperor Valentinian, claims to possess the coat of Christ which was without seam, a nail from the cross, and a part of the crown of thorns. They are shown to pilgrims at rare intervals. A provincial museum contains many antiquities of the Roman and previous periods. The town library possesses a number of rare specimens of early printing and noted manuscripts. Among the latter is the *Codex Aurens,* a copy of the Four Gospels presented by Ada, a reputed sister of Charlemagne, to an abbey. It is bound superbly. The covers are adorned with jewels; the pages are illuminated. During the Middle Ages the archbishop of Treves was one of the electors of the German emperors. The city has at present a population of about 53,100 people. It is an important center of the wine trade.

Triangle, in plane geometry, a figure bounded by three straight lines and having consequently three angles. A triangle having two or more equal sides is said to be isosceles. A triangle having a right angle is known as a right-angled triangle. The side opposite the right angle is called the hypotenuse. The side on which a triangle is supposed to rest is called the base. The angle opposite the base is known as the vertex. The altitude of a triangle is the perpendicular distance from the vertex to the base. The area of a triangle may be found by taking one-half the product of the base and altitude. According to one of the most famous propositions of geometry, the square on the hypotenuse of a right-angled triangle is equal to the sum of the squares of the other two sides. No change can be made in the magnitude of an angle of a triangle without changing the length of one side. Carpenters and builders take advantage of this principle in bracing buildings. A brace nailed or mortised across a joint so as to form a triangle prevents the frame of a building from getting out of shape.

Triangulation. See COAST AND GEODETIC SURVEY.

Triassic System, in geological phraseology, the lowest group of the Mesozoic or Secondary strata. The term refers principally to the three-fold grouping of the System in Germany, where the strata are more fully developed than in England, where these formations occur near Nottingham and Devonshire. They are also found in the north of Ireland. The system is found most complete in Central Europe, however. It is occasionally met with in Sweden and Heligoland.

In North America, the Lower Trias, one of the divisions of the Triassic System, is found in Nova Scotia, Prince Edward Island, the west side of the Hudson River, the Connecticut Valley, and down through North Carolina and Virginia. These strata consist of mottled red and green sandstones, marls, and varied masses, and in the western part of the United States wide areas are covered with deposits which are believed to belong to this period. They occur most abundantly in the regions traversed by the Rocky Mountains, and in California, Alaska and British Columbia. These formations contain few fossils, but animal tracks and foot prints are often found.

The plant life of the period included cycads, such as the sago palm; also ferns and conifers. One of the most beautiful of the animal fossils is the lily encrinite.

Of marine strata, sponges, star corals, star fish and sea urchins have been found. Fossils discovered show that some of the creatures living at that time attained an enormous size. The skull of one (Mastodonsaurus) measured three feet in length by two in breadth. Lizard-like reptiles were numerous, while crocodiles then first appeared. In some of the sandstones footprints of dinosaurs (terrestrial reptiles), which were three-toed and could walk on their hind feet, have been discovered. In the Himalayas, New South Wales, Victoria and Queensland, coal seams have been found in the series. It is generally concluded by geologists that the climate of this period was warm and genial, also that at that time Great Britain was a sandy desert.

Trichina, trĭ-kī′na (plural, **Trichinae**), a small worm much dreaded as a parasite. It infests the muscles of the pig, rabbit, rat, and other animals. In an undeveloped condition each worm becomes surrounded by a small cyst or hardened envelope. When pork containing trichinae is eaten by man, the cysts are dissolved, the trichinae develop rapidly and breed in the alimentary canal, producing myriads of young within a few hours. These find their way into the walls of the intestines, and become encysted in the muscles. The irritation caused by their moving creates a loss of appetite and pains like those of rheumatism. The limbs swell as in dropsy; diarrhoea sets in. The results are always unpleasant and are sometimes fatal. A temperature of 167° F. kills the young trichinae. For this reason it is not considered safe to eat pork that has not been cooked thoroughly. The laws of Germany and other countries require that imported pork be examined under the microscope for trichinae. See PARASITE; TAPEWORM.

Tricolor, in heraldry, a flag composed of three colors nearly equal in mass. The term is applied especially to the flag of France adopted during the Revolution. It consists of three equal vertical parts, blue next to the mast, red at the extremity and white between. The colors, red, white, and blue, are the same as those of our own flag. It is the distribution of these into three equal oblong masses that entitles the French flag to the name of tricolor. See FLAG; UNION JACK.

Trieste, an important Italian seaport that belonged to Austria-Hungary before the World War, is on the Gulf of Trieste, across the Adriatic Sea from Venice, and is 367 miles by rail southwest of Vienna. The city is fortified, and lies along the crescent shaped bay and on the hills behind the bay; the oldest section is that upon the hills. It was a naval base for Austria-Hungary, and there is a large arsenal and good harbor equipment.

Notable features are the schools, library, a Capuchin convent, a Jesuit church, an astronomical and meteorological observatory, museums of antiquity and natural history, handsome municipal buildings and a commercial academy.

Trieste was bombed from aeroplanes during the World War, but the damage was slight. By the Peace Treaty the city and district of Trieste were allocated to Italy. Population, 179,599.

Trigonometry, a branch of mathematics. The literal meaning of the term is measure of triangles. Trigonometry is devoted to the calculation of the angles, sides, and areas of triangles both plane and spherical. A trigonometrical survey is a survey based on triangles. Such a survey is more accurate than a survey by squares. See LOGARITHM.

Trillium. See WAKE-ROBIN.

Trilobite, trī′lo-bīt, one of a group of animals extinct since the coal age. Over 500 species have been described. They are found chiefly in limestone. The fossils are generally of a flattened oval figure, presenting three ridges or lobes running lengthwise, whence the name. They had compound eyes. Scientists are uncertain whether they are the fossils of animals related to crayfish or spiders, but it is believed that their nearest relatives now living are the horseshoe crabs.

Trilogy, the Greek name for a group of three tragedies, usually enacted at the same time and having a connection which terminates in the satyric, or fourth and last act. Of the trilogies remaining, *Oresteia* of Aeschylus, which consists of *Agamemmon,* the *Choephorae,* and the *Eumendies,* is considered the most perfect.

TROPICAL FOREST

1. 18. Fig Tree
2. Monstera
3. Passion Flower
4. Chamaedorea
5. Phytelephas
6. Epidendrum
7. Phalaenopsis
8. 19. Oncidium
9. Begonia
10. Philodendron
11. 12. Alsophila
13. Snakeweed
14. Mauritia
15. Euterpe
16. Mountain Ebony
17. Papaw
20. 23. Anthurium
21. Xanthosoma
22. 27. Coryline
24. Nephrodium
25. Cattleya
26. Dendrolium
28. Tillandsia

Trinidad, trĭn′ĭ-dăd, an island which lies opposite the mouth of the Orinoco, just east of the Caribbean Sea. It is about eighty miles in length and has a population of perhaps 255,000. It was discovered by Columbus, who is said to have given the island its present name on account of three prominent peaks near the shore where he first saw it. Since 1797 it has belonged to Great Britain. Port of Spain is the chief seaport, and the seat of the Orinoco trade. The island is celebrated for its lake of pitch from which 150,000 tons of asphalt are taken annually. See ASPHALT.

Trinitrotoluol, or T. N. T., one of the most powerful explosives known, is a compound of nitrogen peroxide and toulene. It is a yellowish-white solid that melts at 148° F. During the Great War it was extensively used for charging armor-piercing shells, and torpedoes and mines. In exploding, T. N. T. increases the effect of other explosives, such as dynamite, with which it is sometimes mixed in small quantities.

Trinity, three in one, a trio. In theology, the unity of three persons, Father, Son, and Holy Spirit, in one Godhead. The doctrine of the trinity is a distinguishing tenet of the Greek, the Roman Catholic, and, if we except the Unitarian, nearly all Protestant churches. In recognition of the doctrine of the trinity, the number three is a favorite in Christian architecture. Three doorways or portals, three aisles, three-headed windows, the pattern of trefoil or three leaves in tracery, and many other similar uses of three have reference to the trinity. See ARIANISM; UNITARIANISM; NICE.

Triple Alliance, the name applied to the former alliance between Austria-Hungary, Italy, and Germany. It was formed in 1883, and was an extension of a treaty of alliance already existing between Austria-Hungary and Germany. While the exact conditions of the Triple Alliance are not known, it is understood that the treaty provides that in case any one of the members is attacked by Russia or France, the other two will immediately go to the assistance of the nation attacked. While this alliance was renewed in 1907, it was not understood that it was in any way an aggressive alliance, since the most friendly relations existed between Italy and France. About the time this alliance was renewed a military convention was reported to have been signed between England, France, and Italy, whereby any aggressive action from Russia, Austria, or Germany might be prevented. At the outbreak of the war in 1914, Italy declared neutrality. Italy broke the treaty, not only by refusing to aid Austria and Germany in their war against France, but by declaring war against Austria and assuming a hostile attitude towards Germany.

Tripoli, trĭp′o̤-lĭ, a possession of Italy on the northern coast of Africa. It lies next to Tunis. It is a half larger than Texas. The fertile portion consists of several oases in the Sahara and a narrow belt near the coast. The inhabitants are Moors, Arabs, Turks, etc. Jews are numerous. Arabic is the popular language. Turkish is the language of the officials. The capital is Tripoli. It was at one time a possession of Carthage. At the fall of that city it became a province of Rome. Later it was conquered by the Arabs, by the Turks, and by the Barbary pirates. In 1714 it became independent. In 1804, during this period of piratical independence, the United States declared war on Tripoli. The Tripolitans were so given to piracy that the nations were glad to have any power bring them to time. They were reduced to subjection again by the Turks in 1835. The population is not far from a million. Barley is the chief food of the people. Dates, oranges, and lemons are raised. Esparto grass, ivory, ostrich feathers, and goatskins are exported. As a result of the late war between Turkey and Italy, Tripoli was annexed to Italy.

Triton, in Greek mythology, a son of Neptune and Amphitrite. According to the accounts of the poets, it was his duty to blow a trumpet to announce his father's coming. He was celebrated for his wisdom and knowledge of future events. He had the power of changing his form at will. In the later mythology, a race of tritons was brought on the scene. They were subordinate deities. They followed in the train of the greater sea god and were full of pranks and fun. Like Triton, they had

the power to change their form, and appeared frequently with the upper parts of a human being and the lower parts of some animal. They were represented in art as blowing conch shells to soothe the waves. The name triton has a wide application in natural science. Various shells, conch-bearing animals, and salamanders, are known as tritons.

Triumvirate, in Roman history, an agreement or alliance formed between three men. The First Triumvirate was formed 60 B. C. between Caesar, Pompey, and Crassus. Caesar had command of the field forces in Gaul; Pompey was made commissioner of corn supplies; Crassus had command in the east, where he was killed in 53 B. C. The Triumvirate ended in the civil war of 49 B. C., by which Caesar became supreme. The Second Triumvirate was formed in 43, between Octavius, Mark Antony, and Lepidus. The conspirators, for we may call them that, met on an island near Bologna. Octavius received command of the west, Antony of the east, and Lepidus of Africa. Octavius, known in history as Augustus, used the armies for his own purposes. In 31 B. C. he became supreme. See CAESAR; POMPEY; CRASSUS; ANTONY; OCTAVIUS.

Trogon, a general name for a large family of tropical and semi-tropical birds, including about fifty specimens. The trogon has yoke feet like the feet of the woodpecker, save that the first and second toes of the trogon are directed backward, while the first and fourth toes of the woodpecker are reversed. The trogons are forest birds living on insects and berries. They are remarkable for softness and brilliance of plumage. The quetzal of Central America, known also as the long-tailed paradise or peacock-trogon, is one of the most gorgeous birds known. The body is no larger than that of a pigeon, but it is clothed in soft golden-green and crimson plumage, while the long upper tail-coverts project half a yard or more beyond the tail, forming a graceful spray or train. This trogon was held sacred by the ancient inhabitants of Central America.

Trolley Car. See STREET RAILWAY.

Trollope, trŏl′up, **Anthony** (1815-1882), an English novelist. He was a native of London. He was educated at the schools of Harrow and Winchester. When a young man he entered the postal service, a department in which he spent the greater part of his life. Later he was an inspector of posts in Ireland and England. In 1868 he visited the United States on postoffice affairs. The result of the trip was *The American Senator.* In 1865 he established *The Fortnightly Review.* He began writing novels as early as 1847. *The McDermotts of Ballycloran* was the first. It was followed by *The Kelleys* and *La Vendée.* These attracted little attention, but *The Warden,* published in 1855, was an entire success. *Barchester Towers, Doctor Thorne, Framley Parsonage,* and *The Last Chronicle of Barset* belong to the same series as *The Warden.* In these, Trollope did his best work as a novelist. A group of political novels followed. Trollope's books had a wide circulation during his lifetime, but lost in popularity after his death. They possess qualities, however, which are deserving of the appreciation to which a recent revival of interest in them has testified. His characters are well drawn, and his pictures of English life in the third quarter of the nineteenth century are vivid and true. His stories are wholesome, pleasant reading. He is said to have written more fiction than any other author of the nineteenth century. In 1875 he wrote his *Autobiography,* which was not published, however, until the year after his death. He is best known in American schools as the author of a *Life of Cicero.* His mother, Mrs. Frances Milton Trollope, was also a writer of repute. His brother, Thomas Adolphus Trollope, resided for thirty years in Florence, and wrote chiefly on Italian topics.

Trombone, a large musical instrument of the trumpet kind. It has a long tube bent twice upon itself. One of the loops is double. The player slides it in and out to change the pitch of his notes. When the loop slides out the tube is lengthened and the note is lowered. The change of length covers a full octave. The tone of the trombone is rich and impressive. It is a favorite instrument in an orchestra or military band.

See ORCHESTRA.

Trondhjem, trō′jém, the ancient capital of Norway, is situated on the western coast on a deep fjord at the mouth of the Nid River. The climate is mild and the surroundings pleasant. The Cathedral, which is the largest church edifice in Scandinavia, is the chief object of interest. According to the constitution of Norway the kings must be crowned here. Population 54,520.

Tropic, in geography, one of two parallels of latitude situated 23½° from the equator. That north of the equator is the tropic of Cancer; the southern is the Tropic of Capricorn. The term tropic signifies to turn or change, having reference to the limit beyond which the vertical rays of the sun never pass. The Tropic of Cancer and the Tropic of Capricorn include a belt 47° wide known as the Torrid Zone. The tropics is used to designate the regions within or near these two lines.

Trotzki, trots′ ki (1877-), a Russian agitator, one of the leaders of the Bolshevist revolution that overthrew the Kerensky government in November, 1917. Since 1917 he has been a close associate of Nicolai Lenine (which see). He was made Minister of Foreign Affairs in Lenine's Cabinet, but later became Minister of War. Upon him devolved the responsibility of organizing and training the vast Soviet army that was to defend the Bolshevist government from foes without the country as well as from opposing factions within.

From 1905 to 1912, he was a Siberian exile. He then preached radicalism in Germany and Spain. Later he came to New York, and edited the *New World,* a radical paper, until he joined Lenine a short time before the Bolshevist revolution.

Troubadours, trōō′ba-dōōrs, a name given to a class of poets who flourished in Provence, France, and in northern Italy from the middle of the tenth to the end of the thirteenth century. In the development of the French language, we find the prevailing dialect of the south called Langue d'oc (language of oc); that of the north, Langue d'oui (language of oui), from the two words for "yes," oc and oui, used respectively in the two dialects. Langue d'oc was also called provençal, and it was in this language that the troubadours sang their songs. They seem to have invented a particular variety of lyric. Love was the special theme of the troubadours, as it was of the minnesingers of Germany. They also sang of war, and songs of expression of religious fervor are common, inspired doubtless by the religious enthusiasm of the Crusades. Public events of importance also furnished subjects for the troubadour. The troubadours to the number of thousands appeared almost contemporaneously. For three centuries such poets held high reputation. Almost suddenly the language declined, the troubadours ceased to sing, and this literature, the outgrowth of an age and in no sense the result of individual genius, entirely ceased, having left an enormous number of poems, many of them pleasing and beautiful, but not a masterpiece among them. See BLONDEL; MINNESINGERS; TROUVÈRES.

Trout, a name applied to a large number of fish belonging to the salmon family. The trout is related, therefore, to the salmon, whitefish, shad, herring, menhaden, tarpon, and tunny. The trout of North America are classified in five groups,—the mountain trout, the rainbow trout, the steelhead trout, the lake trout, and the brook trout.

The species known as the mountain trout is the principal fish of the Rocky Mountain region. Although occupying elevated lakes, it is a large fish attaining a length of three feet and a weight of thirty pounds. It is to be found in every lake and stream of importance in the Rocky Mountain region from New Mexico far northward into Canada. In the northern part of its range it extends westward to the Pacific coast, where it is found in salt waters. Those taken in the sea are of a silvery color. The farther inland, the darker the fish. Those in the interior of the Rocky Mountains are almost black. Grouped with the mountain trout are thirteen other species. The more important are the Yellowstone, the Silver, the Lake Tahoe, the Truckee, the Utah, and Jordan's trout.

The rainbow trout is considered the most beautiful fish in American waters. A large specimen is from fifteen to eighteen inches in length. The back is spotted like the

Eastern trout. The sides are striped with the colors of the rainbow. It varies in weight from half a pound to possibly five or six pounds. Like other members of the family, it is a spirited, fighting fish, quite likely to play havoc with tackle. In range it is confined to the small streams of California. In addition to the rainbow trout proper, there are five other species, known as the western Oregon brook trout, the McCloud River rainbow trout, the Kern River trout, the golden trout of Mt. Whitney, and Stone's trout, all Pacific coast species.

The steel-head trout group includes the steel-head proper, the speckled steel-head, the Kamloops, and the blue-back trout. The fishes of this group belong to the bays and streams of the Pacific coast. They are taken like salmon and are canned for the market.

The largest of American trout is the lake trout. It is known sometimes as the Great Lake trout or Mackinaw trout. This species is found in the cold lakes and waters of America from New Brunswick and Maine westward to Vancouver Island and northward as far as Hudson Bay and Alaska. It is a dark fish varying in color from gray to black. The entire body of the fish, including the upper fins, is spotted. The ordinary weight is about fifteen pounds, though specimens have been taken weighing as high as 125 pounds. As compared with other fish, the female does not produce a large number of eggs; 5,000 or 6,000 is considered the usual number. The spawning season of the lake trout extends from September to December. The spawning grounds are reefs of rock from 6 to 100 feet beneath the surface. The lake trout is one of the important food fishes. Recently American fishermen supplied the market with 10,611,588 pounds of lake trout, taken chiefly in the Great Lakes. The United States Bureau of fisheries distributes over 337,838,000 young fish and eggs every year.

The trout fishery of Lake Superior is organized systematically. Long nets, joined end to end, until they are three to four miles in length, are set near the center of the lake at a depth as great as 500 feet. An organized party of fishermen sets five such strings or gangs of nets, marking their place, of course, by buoys. Each day, one gang of nets is elevated by steam power. The net passes over a drum and is paid out behind the boat. The fishermen take the fish out of the net as it rises from the sea. Each gang is left in the water five days without examination.

The trout of literature is the brook trout. The brook trout on the two sides of the Atlantic differ little in appearance. They like cool, clear, running water, containing springs, and at least pools that are not frozen over during the winter. The sides of this trout are marked with from fifteen to twenty crimson and black spots. The back and dorsal fins are marbled beautifully. The lower fins are of a bright crimson, edged with white. The back is of an olive color; the lower side, pink; the belly is of silver white.

In America the brook trout is found from the mountains of Virginia to the Arctic Circle. It varies in weight from a few ounces to a limit of eleven pounds. When the brook trout is ready to spawn she seeks a sandy shallow and whips the gravel aside with her tail fins until a smooth hole or nest two or three inches deep is formed. Here she deposits her eggs, usually late in November. The brook trout is one of the most beautiful, agile game fishes in the water. It is to be sought in the most shady, picturesque glens. It rises to a fly. It is taken usually by casting. All in all, it is the favorite fish with anglers. The United States fish bureau is doing all that can be done to prevent the extermination of the brook trout.

See SALMON; FISHERIES.

Trouvères, a class of poets who appeared in the north of France during the twelfth century. They correspond to the troubadours of the south. While the Langue d'oc or Provençal tongue was declining gradually in the south, a new language, Langue d'oui was maturing, and with it a literature was developing in the north. The names of troubadour and trouvère are simply different forms of the same word. The poetry of the trouvères is as different from that of the troubadours as is their language. The trouvères produced epics and narrative poems instead of lyrics. Their sub-

jects were the romances of chivalry and tales of supernatural occurrences, including three distinct classes, those relating to King Arthur, those relating to Amadis, the Gaul, and those concerning Charlemagne and his paladins. Allegories, fables in verse, and the dramatic compositions of the mysteries were also among the productions of the Trouvères. See TROUBADOURS.

Trowbridge, John Townsend (1827-1916), an American story writer and poet. He was born at Townsend, New York. He received a common school education and in 1846 went to New York, where he began writing for journals and magazines. He became editor of a journal called *The Sentinel,* but lost his position through publishing an editorial against the fugitive slave law. *Neighbor Jackwood,* a story protesting against slavery, was read widely, and was dramatized successfully. Trowbridge was managing editor of *Our Young Folks,* and was one of the original contributors to *The Atlantic Monthly.* Mr. Trowbridge is best known as a writer of stories for boys. *The Jack Hazard Series,* including *Jack Hazard and His Fortunes, A Chance for Himself, Doing His Best, Fast Friends,* and *The Young Surveyor,* first published in *Our Young Folks,* will long be popular with young people. They recount the experiences and struggles of a homeless New England boy, telling of his schooling, his friends, his mistakes, his failures, and his final success. Over 13,000 copies of *Cudjo's Cave,* another well known story published in 1864, were sold in one week. Trowbridge is the author of many short stories and poems. *The Vagabonds* is his best known poem.

Troy, a city of New York. It is situated on the east bank of the Hudson River at the head of tidewater navigation. The Erie canal connects the Hudson at this point with Buffalo, and the Champlain canal gives water communication with Lake Champlain and the St. Lawrence. Steamers from New York City, canal boats from the shores of Lake Erie, and canal boats from Canadian waters meet here and are the sight of the city. These commercial facilities are supplemented by railroads and local trolley lines. The business portion of the city occupies a narrow plain, extending north and south along the river, with bluffs in the rear. The city is well built; the postoffice, court house, city hall, public library, the union station, the savings bank building, music hall, the Rensselaer Hotel, and other public and semi-public buildings testify to public spirit and wealth. There are electric lights, excellent waterworks, and fifty miles of paved streets. A complete public school system, Willard Seminary, and the Rensselaer Polytechnic Institute afford educational advantages.

Troy is noted for manufactures. It is the greatest collar and cuff center in the world. Henry Burden developed his machine-made horseshoe here. Guns for coast defense are made at Watervliet on the opposite shore of the Hudson. Troy lays claim to an early industry that gave rise to the expression "Uncle Sam." The current account runs that "Uncle Sam" Willson furnished the American army with beef during the war of 1812. It was packed in white oak barrels and was spoken of by the soldiers as "Uncle Sam's" pork. From this start all supplies furnished by the United States became known as "Uncle Sam's."

Troy occupies ground in the center of a region rendered historic during Burgoyne's campaign. There are a number of noteworthy monuments. The more recent are in Oakwood cemetery, including shafts to General Wool of the Mexican War and General Thomas, the Rock of Chickamauga. A soldiers' and sailors' monument adorns one of the city squares. The city was formed by the union of various farms and villages. Population, 1920, 72,013.

Trowbridge, William Petit (1828-92), an American engineer, was born in Michigan and educated at West Point. During the Civil War he had full charge of the Engineer Agency of New York City. He is believed to have been the first to suggest the idea of the cantilever bridge. He held the position of professor of mathematics at several universities.

Troy, or **Ilium,** an ancient city of Asia Minor. It was situated in the plain of the Scamander River, near the Asiatic side of the entrance to the Hellespont. The legend of the siege of Troy is the most celebrated in antiquity. It furnishes the theme of Homer's *Iliad* and *Odyssey,* and is, in

part, the theme of Virgil's *Aeneid*. According to the legend, Troy was a strongly walled city inhabited by Asiatics. Paris, son of Priam, the king, visited Menelaus, king of Sparta, and repaid his hospitality by carrying away his wife, Helen, the most beautiful woman in Greece. Menelaus called on his countrymen to aid him in taking revenge. Achilles, the lion-hearted, came with his Myrmidons from Thessaly; Odysseus, the crafty king of Ithaca, and the aged Nestor, sage in council, came at the call. Agamemnon, king of Mycenae and brother of Menelaus, was made commander-in-chief. A hundred thousand warriors, twelve hundred war galleys, they crossed the Aegean and laid siege to Troy. Wondrous deeds of valor were done under the old walls. The Trojans drove the Greeks repeatedly to their ships. Achilles slew Hector, the valiant son of Priam, and dragged his body at the tail of his chariot around the city. The siege lasted for ten years, 1194-1184 B. C. At last the Greeks gained entrance through the strategy of the wooden horse. They built an immense wooden horse, the body of which they filled with armed men. The rest of the Greeks withdrew to their ships and sailed away, leaving behind one man, Sinon, who was taken prisoner. Sinon acted well his part. He pretended to have been deserted by Ulysses and to be terribly frightened. When told that his life would be spared, he explained to the Trojans that the horse was an offering to Minerva and that it was made of great size lest it be taken into the city and thus win the favor of the goddess for the Trojans instead of the Greeks. So the horse was taken into the city with much rejoicing. At night the armed men came forth from their concealment and opened the gates for their companions who had returned. Carnage and conflagration, and "Troy was not." The very site of the city was long in controversy.

In 1870 Dr. Schliemann, an enthusiastic German student of Homer, began a series of excavations on a mound popularly believed to be the site of the lost city of Troy. As he descended, he found nine distinct strata—the remains of nine cities, one under the other. The second stratum from the bottom, fifty feet below the present surface, revealed massive walls and defensive gateways, the foundation of a palace and archaic articles of gold, silver, and bronze. For a time this was believed to be the Troy of Homer, but later enlargements of the excavations have established the conviction that the Troy of Homer is the sixth from the bottom, and that still older civilizations preceded the age described by Homer.

Above the Homeric city is a Grecian city, evidently a place of wealth and magnificence in the time of Alexander. Above this are the remains of a Roman city, and finally, at the present surface, a wretched Turkish village, squalid with dogs and offal, the Hissarlik of modern atlases.

Troy Weight, a system of measures used in weighing precious metals. In the Middle Ages each commercial city had its official measures, as the foot, gallon, pound, etc. Troyes, a city of some importance, situated southeast of Paris, was one of these. Among the local measures that have survived and have acquired national and even international acceptance are the Winchester bushel and, it is believed, the pound of Troyes, or the pound troy, as it came to be known. It had been for some time the standard of weight for silver spoons, etc., but in 1527 it was made the basis of English coinage. It was for a time the standard of weight in England for bread, silk, and jewelry as well. The pound troy contains 12 ounces, or 240 pennyweights, or 5,760 grains. The pound avoirdupois contains 7,000 grains troy. See AVOIRDUPOIS.

Truce of God, in feudal times, a regulation of the church forbidding private hostilities between Wednesday evening and the following Monday morning of each week. In addition the truce covered the time of church festivals. See FIST-LAW.

Truffle, a genus of subterranean fungi, much esteemed as a table delicacy. There are about fifty species. They have the shape of a potato and are black or bluish outside with a white interior. They range in size from that of a Brazil nut to that of a large potato. They grow in limy soil, usually in birch or oak forests. They never appear above ground. In France hogs are trained to root them out. In England dogs are trained to locate them and indicate their presence by scratching.

Trumbull, John (1756-1843), an American painter. He was a son of Jonathan Trumbull and a native of Connecticut. He was graduated at Harvard, studied painting in Boston and served in the Revolutionary War. Later he was a student of Benjamin West, then in England. He is best known by four great works in the rotunda of the Capitol at Washington: the *Declaration of Independence,* the *Surrender of Burgoyne,* the *Surrender of Cornwallis,* and the *Resignation of Washington at Annapolis.* He gave most of his pictures to Yale College. He painted portraits of Washington, Adams, and Jefferson, and pictures of *The Battle of Bunker Hill* and *The Death of Montgomery.*

Trumbull, Jonathan. See CONNECTICUT.

Trumpet, a well known musical wind instrument. It is the type of a large family, including the bugle, horn, trombone, cornet, etc. The essential parts are a tube, cup-shaped for the mouth at one end and bell-shaped at the other. The tones are produced by the vibrations of the player's lips. The simple trumpet is straight; the cavalry trumpet is bent twice upon itself; the orchestral trumpet is fitted with a sliding section for changing the length of the tube. The addition of finger holes and valves increases the range of notes. The trumpet is the traditional instrument of war. Mars is represented in art as blowing the trumpet of war. Its peal is stirring and imperative, putting life into the feet and courage into the heart. The trumpet's call is the signal of advance, the signal of the wild charge. See ORCHESTRA.

Trumpet Creeper, a climbing shrub of the warmer parts of America. It is related to the catalpa. It bears showy trumpet-shaped orange and scarlet flowers. This is one of the flowers that may well make Northern people envious of the South. Of a dozen different kinds known by various common names, as yellow elder, cape honeysuckle, trumpet vine, and Australian bower-plant, only one, our native species, can be reared as far north as Massachusetts.

Truss. See BRIDGE.

Trust; in general, a charge received in confidence, or that which is confided to one's faith; or a reliance on the integrity, veracity, justice, friendship, or other sound principle of another person. Thus, in a legal sense, or rather in one of its legal senses, a trust is (a) an obligation arising out of a confidence reposed in a person to whom the legal title to property is conveyed, that he will faithfully apply the property according to the wishes of the creator of the trust; (b) the beneficial right, title, or interest in property, distinct from the legal ownership; (c) that which is held as a trust; or (d) the legal connection or relation existing between the holder of property in trust and the property itself.

COMMERCIAL TRUSTS. In commerce, however, the term trust has several other meanings, and has long been loosely used as a term of reproach for large trade combinations, although this use of the word is now not so common as in the last decade of the nineteenth century and the early days of the twentieth, when "trusts" were the most fruitful object of political attack, alike by statesmen and demagogues, and every large combination of capital, no matter how innocent of wrongdoing, was subject to public suspicion. This broad use of the word "trust" to describe combinations which were not really in the trust form, producing confusion and often unwarranted prejudice, is gradually being abandoned.

The various forms of commercial trust, condemned by the law may be enumerated and described as follows:

1. A central committee or body of men to whom is delegated, as a corporate or proxy trust, the voting and other powers of several corporations which they represent, for the purpose of exercising a common authority in regulating and controlling the supply, price, use or disposal of some kind of goods or personal property, usually manufactured products. It has been held in law that where corporations, acting officially or through their stockholders, transfer their business and property to trustees to be managed for them, they exceed their lawful powers. It was this surrender by corporations of the power of individual corporate action, while retaining their corporate or individual existence, and while held responsible by the state as acting corporate bodies, that brought about the legal

dissolution of numerous trusts of this character in the United States, notably the Sugar Trust in New York and the Northern Securities Company in Minnesota; but many such combinations have been reorganized, under other forms, especially in states that have liberal incorporation laws, like New Jersey. This form of trust, or any combination employing unfair or surreptitious methods to raise prices, or to obstruct, by exclusive control, the ordinary course of trade, is obnoxious to law, as declared by the Sherman Anti-Trust Act of July 2, 1890, which declared that "every contract, combination in the form of trust, or otherwise, or conspiracy, in restraint of trade or commerce among the several states, or with foreign nations, is hereby declared to be illegal." Note that the essence of such an illegal trust is that it must be a combination or conspiracy in restraint of trade.

2. Another kind of commercial trust is a combination of interests in the form of a company, organization, or association, holding a controlling share of the stock of several smaller corporations engaged in the same or allied branches of business or industry, a majority of the stock in each of the component corporations being transferred to a central committee or board of trustees, in whom the supreme authority is vested, and who, while issuing to the stockholders certificates showing their individual interests and rights to dividends, use the voting power of the stock in electing boards of directors for the various associated corporations and in any other way that may be deemed judicious, thus directing their policy for the common object of unifying management, suppressing or lessening competition, regulating prices and output, cheapening cost of production, expanding business, and increasing profits.

3. A third form of trust is a combination or consolidation of several individuals, companies, or corporations, engaged in or pursuing the same or allied branches of business or industry, into one corporation, which becomes the absolute owner of the stock, properties, and interests of the component companies, new stock certificates and bonds being issued in accordance with the capitalization, the policy, and the scope of the new organization, and the general affairs of which are administered by one centralized management consisting of a board of directors and executive officers, whose object is to expand business and increase profits by lessening or eliminating competition, lowering the cost of production and regulating the amount produced. Such a combination, according to the United States Supreme Court, is, within the meaning of the Sherman Act, a trust; "but if not, it is a combination in restraint of interstate and international commerce, and that is enough to bring it under the condemnation of the act."

Thus it is seen that commercial trusts are, or were, divided into three classes: First, the corporate or proxy trusts which exercised the voting and other powers of the corporations they represented, while the latter retained their separate corporate existence, with amenability to the laws of the states in which they were situated. Second, trusts that controlled various corporations by ownership of a majority of the stock in each. Third, trusts in which the dominant organization is the actual owner of the stock and properties of the component corporations. It is contended by many authorities that the word "trust" in such cases is a misnomer, the word combination, or "consolidated companies," more nearly expressing the real nature of these organizations. Professor Ely, an eminent economist, said on this point: "As corporations are combinations of individuals, we now have trusts, which are combinations of corporations, and a great part of many industries is now carried on under one general management."

The Standard Oil Company, often referred to as the Standard Oil Trust, is called the original industrial trust of the United States. It was formed because the Federal form of government made some such organization necessary for the efficient conduct of a consolidated business in the various states of the Union. The Standard Oil Company wanted to do business in all parts of the country, but a corporation of one state can do business in another state only as permitted by that state. Hence the oil company formed corporations in various states, so as to be under the separate law of each, to be responsible under it, and to

be protected by it; whereupon these separate state corporations turned over their powers to the central trust that was formed to receive them and to operate them all as a single company. This having been declared illegal under the Sherman Act, the central trust was dissolved, and the state companies resumed their individual powers and operation under the respective state charters, as at present. The same process was followed in the case of other well-known combinations, and received the popular designation of "unscrambling the trusts."

See MONOPOLY.

Tschaikowsky, chī-kŏf′skĭ, **Peter Ilyitch** (1840-1893), the greatest Russian composer. He was born in Votinsk, the son of a mining engineer who had him educated at an institute of technology in St. Petersburg. But the young man's musical talent was great, and after a brief service in the Russian government, Tschaikowsky entered the conservatory at St. Petersburg under Anton Rubinstein. In 1866 he was sent to Moscow to teach in a newly-opened conservatory; he disliked teaching, but made up for its irksomeness by composing. Twelve years afterward a sum of money placed at his disposal by an unknown woman enabled him to give his whole time to composition. Hating society, he retired to a littel house near Klin, where he lived so quietly that he was called "The Hermit of Klin." When but fifty-three years old Tschaikowsky was smitten by cholera and died. His work is varied in character, probably his greatest compositions being his symphonies. The last of these, the beautiful *Pathetic,* is the most sorrowful music ever written. *Romeo and Juliette* is a passionate fantasia. Several of his hundred lyric songs, *The Nutcracker Suite, Manfred, Francesco da Rimini,* and *The Tempest* are also among his best-liked compositions.

Tsetse, tsĕt′sē, a South African fly. It is a trifle larger than a house fly. It is brown in color and has four yellow bars across the abdomen. It has somewhat the appearance of a small brown horsefly. It it a terrible pest. Its bite has long been considered fatal to the horse, ox, and dog. Livingstone, the African explorer, lost forty-three oxen in a single trip. As a matter of fact, it has been ascertained that the fly is merely a carrier of disease. Like the malaria-carrying mosquito, it sucks up infection when stinging a diseased animal and introduces the germs when stinging a healthy animal. Its bite has no effect on man, or mules, or on the native wild animals. The difficulty of cultivating fields where oxen and horses cannot be depended upon, and the impossibility of grazing cattle in certain regions, has retarded the settlement of South Africa. There are seven species of the fly. Only one carries the blood parasite. See FLY; MOSQUITO.

Tuber, an underground stem of plants. The subterraneous portion is often thickened, as in the potato and the artichoke, and is used for food. There are no leaves, but scales are found on the stem instead, on which grow the latent buds, or eyes. These plants are perennials. The term is also applied to the species of underground fungi, known as truffle. See ARTICHOKE; POTATO; TRUFFLE.

Tuberculosis, a more general and, in many respects, a more fitting name for the wasting disease known as consumption. The name is derived from the minute tubercles which are formed by the bacilli in various tissues of the body. The bacillus of tuberculosis is a rod-shaped bacterium. It was discovered and described in 1882 by Dr. Robert Koch (1843-1910), a distinguished German bacteriologist who, a year later, discovered the bacillus, the presence of which is a sure test for Asiatic cholera. See CONSUMPTION.

Tuberose, a near relative of the hyacinth, or daffodil. It is strongly scented, easily grown house plant, with long white funnel-shaped flowers crowded on a central stem. A native of Mexico. The name signifies tuber-bearing (tuberous), and has no reference to the tube of the corolla nor to a rose.

Tucson, Ariz., the second city of the state and the county seat of Pima County, is on the Santa Cruz River and on the El Paso & Southwestern and Southern Pacific railroads, 135 miles southeast of Phoenix, the capital, and about 67 miles north of the international boundary. From Tucson

direct connection is made at Nogales with the Sud Pacific de Mexico Railway to the whole west coast of Mexico. It is the commercial center for a large mining, farming and stock raising region, and has manufactories of saddlery, wagons, harness, flour and iron. Live stock is the most important item of commerce. The Southern Pacific Railway shops, employing over a thousand men, are located here.

The climate of this region is dry and healthful, and Tucson is a favorite resort with those who suffer from pulmonary diseases. Attractive features of the city are the Desert Botanical Laboratory of the Carnegie Institution, United States Magnetic Observatory, University of Arizona, Saint Joseph's Academy, Carnegie library, Saint Mary's and Tucson-Arizona sanitariums, Arizona Hospital, El Paso & Southwestern Station, several parks, Masonic Temple, San Xavier Mission and a new $1,000,000 high school.

A permanent settlement was first made here in 1776, the land having previously been the site of an Indian village. The settlement was at the beginning on land belonging to Spain, but this came into the possession of the United States in 1853. For ten years, 1867-77 Tucson was the capital of Arizona Territory. In 1920 the population was 20,292.

Tudor, an English ruling family. The name is Welsh, meaning Theodore. The Tudors were descended on the female side from John of Gaunt. They ruled England from 1485 to 1604. The tudor sovereigns were Henry VII, Henry VIII, Edward VI, Mary, and Elizabeth. The inauguration of Henry VII ended the feuds of the Yorkists and Lancastrians.

Tuesday, the third day of the week. It is so called from the Anglo-Saxon god of war, Tiu or Tyr, and the term is a translation of the Dies Martis of the Romans. Shrove Tuesday, the day for confessions, is the Tuesday before Lent.

Tug of War, any severe, laborious contest. In athletics, a tug of war is a trial of strength in which the opposing sides tug at opposite ends of a rope or cable. The party which is able to draw the other across a boundary line, or which has the advantage at the end of a given time, is adjudged to have won. Participants must engage with bare hands. It is not allowable to knot the rope, to wind it around the hand, or to employ any artificial means of holding on.

Tuileries, twē'le-riz. See LOUVRE.

Tulane University of Louisiana, the state university of Louisiana. It is located at New Orleans. The institution was established by act of the state legislature in 1847. In 1884 a bequest of $1,000,000, left by Mr. Paul Tulane for higher education, was placed at the service of the institution, and the legislature prefixed the name Tulane in recognition of the giver. Tulane has the income from funds amounting to $3,000,000. The state votes support annually. The University has several colleges. That of medicine ranks high. Tulane is considered reputable and scholarly. There were in 1921, 350 professors and instructors and 3,000 students.

Tulip, an early flowering, bulbous plant of the lily family. The name is Persian, signifying a turban or Turk's cap, which the flowers certainly resemble. In the north tulip bulbs are set in the fall where they are desired to bloom, and are protected by several inches of litter as soon as freezing sets in. In heavy soil a handful of sand may be placed beneath each bulb. Tulips were brought to Vienna from Turkey early in the sixteenth century. Bulbs reached Holland as early as 1591. A rage for new and desirable tulips set in throughout the Netherlands, culminating in the celebrated tulip craze of 1634-38. As high as 13,000 florins, $5,000, was paid for a single bulb of a coveted strain. Holland is still the center of tulip growing. The tulip gardens of that country are valued at $5,000 an acre. Under Dutch management an acre of garden yields 66,000 bulbs a year. Growers recognize forty-two varieties. See FLORICULTURE; MARIPOSA LILY.

Tulip Tree, Whitewood, or **Yellow Poplar,** a stately American tree of the magnolia family. A fine tree for parks. The name tulip tree is derived from the shape of the large flowers. Whitewood timber is a soft, fine grained, slightly yellow wood, in great demand for wagon boxes, furniture, and boat building. It is not apt to warp or split, and is easily

worked. The tulip tree grows from Rhode Island to Mississippi, and northward to Michigan.

Tulsa, Okla., the county seat of Tulsa County, is situated on the Arkansas River, and on five railroads, 120 miles northeast of Oklahoma City. Tulsa is the oil capital of the world. It is in the heart of the world famous Mid-Continent Oil Field, and almost every operating company in this field maintains headquarters in Tulsa. The city is well paved and lighted, has splendid parks and boulevards, and probably possesses more palatial homes than any other city of like size and age in the United States. Its schools are the most modern, it has fine libraries, and some of the buildings in the business district are ten, twelve and more stories high, and are modern in every respect. Its oil refineries are numerous, and there are manufactories of oil well supplies, boilers and tubes, glass, cotton-seed oil, and many other commodities. In 1900, Tulsa had a population of only 1,390, while in 1920 the population was 72,075.

Tumble-Bug, a beetle known by the habit of rolling spheres of dung in early summer. These they roll long distances, working two and two together, and finally bury them in quiet corners. The female lays an egg in one side of the ball, which serves for the food and protection of the young maggot. The ends of the feelers or antennae of the tumble bugs are flattened like spades. The wing covers are so short as to expose the tip of the abdomen. The bugs are generally black, but are frequently brilliantly colored. See article on SCARABAEUS, the sacred tumble-bug of Egypt.

Tumbleweeds, branching plants which grow in a globe-like form and, when dry, break off at the ground and are bowled along by the wind, thus scattering their seeds far and wide. They blow about the prairies of the Dakotas and other western states in such numbers that often long stretches of wire fence will be found banked high with them, caught and held there. Chasing tumbleweeds is a favorite sport of children who live on the plains. Some of the weeds which "tumble" are two species of amaranth, one of which, usually called the tumbleweed, is the commonest of these plants, the bug-seed, and the winged pigweed. The canada thistle behaves in somewhat the same manner.

Tumor, literally, a swelling. The older pathologists named four necessary accompaniments of inflammation, designating them by Latin words, calor, dolor, rubor, et tumor, meaning, heat, pain, redness and swelling. In more modern use the word tumor is applied to a swelling formed by new tissue and is thus distinguished from hypertrophy, that is, the over-development of any organ or part.

There is a great variety of tumors recognized by the medical profession. They may be divided into two classes, benign, or non-malignant, and malignant. Benign tumors are unlikely to recur if removed and do not endanger the patient's life. Malignant tumors may recur after removal, and are likely to cause death eventually. Certain tumors are recognized which are sometimes benign, sometimes malignant. Tumors are grouped also according to the tissues in which they arise as, connective-tissue, muscle-tissue, nerve-tissue, vascular-tissue, and epithelial-tissue tumors. Little is known as yet regarding the actual cause of tumor formation. In the majority of cases the treatment required is removal of the tumor by a surgical operation at the earliest possible moment. The word cancer and tumor are often confused. It will be seen from the definition of tumor that a cancer is always a tumor. Cancers belong to the epithelial-tissue group.

See CANCER.

Tundra. See ALASKA; SIBERIA.

Tungsten, a metallic element. It is known also as wolfram. Symbol, W; specific gravity, 16.6. It is a heavy metal, harder than glass and more magnetic than iron. It was long mistaken for tin. It is worth about $1.25 a pound. Pure tungsten is hard enough to scratch glass. Tungsten fuses at a higher temperature than any other metal known. Tungsten metal is used for the filament of electric light bulbs. It is considered superior to the old bamboo and the newer carbon filament. It is claimed that, with a tungsten filament, only one-third as great an electric current is needed. As the metal cannot be drawn into wire, the filaments are formed by forcing tungsten "dough" through an "eye."

An alloy of tungsten is used for tool steel. It resists rust. Five per cent of tungsten is used in making magnets. Tungsten for strength is added to steel used in heavy guns and battleship armor. Aluminum with a percentage of tungsten combines lightness and strength, a union of qualities much sought by makers of automobiles. Ores from which tungsten may be extracted are found in Montana, Canada, Australia, New Zealand, Great Britain, Saxony, Bohemia, and Spain, but a less expensive source of supply is to be desired.

Tunis, one of the Barbary states. It lies on the Mediterranean, northeast of Algeria. It formerly belonged to Turkey but it is now a French protectorate. The government is administered by French officers. Southern Tunis lies below sea level and contains tracts of salt marsh. Northern Tunis is mountainous, with many fertile valleys. The upper reaches are covered with oak. The valleys shelter 537,000 cattle, 75,000 horses, 140,800 camels, 2,182,800 sheep, and 1,285,000 goats. Agriculture is the leading occupation. The chief exports are esparto grass, hides, tallow, ores, dates, olives, sponges, dyes, almonds, oranges, and cork, in all, about $60,000,000 a year. The natives are skillful in weaving woolens and carpets, in embroidering leather, and in making saddles and slippers. The fisheries, including sardines, anchovies, tunny, and other fish, are worth $2,500,000 a year. Area, 50,000 square miles. Population, 2,094,000, largely Arabs, and including 48,400 Jews. The ordinary expenditure for public purposes is $12,000,000 a year. Tunis, the capital, has a population of 170,381, inclusive of 72,000 Europeans. See ALGERIA.

Tunnel, an underground passage. The oldest tunnels known are those of Egypt and India. They were used for tombs and temples. The Romans tunneled to drain lakes, to straighten their highways, and to construct sewers. The French built a number of tunnels through which to lead canals. The aqueducts of the ancients were led, not infrequently, through tunnels constructed in the solid rock.

Wherever tunnels pass through loose earth or crumbling rock it is necessary to prevent caving by walls of timbers or of masonry. The first tunnel in the United States was built at Auburn, Pennsylvania, in 1821, to permit the passage of coal barges. Well known American tunnels may be mentioned: That under the St. Clair River at Detroit, for the Grand Trunk Railway; the Croton Aqueduct tunnel, thirty-one miles long, at New York City; the Hoosac Tunnel of western Massachusetts; the tunnels of the Northern Pacific Railway and of the Great Northern Railway in the Cascade Mountains; the Sutro Tunnel, leading into the mines of the Comstock Lode of Nevada; the tunnels of the New York underground tramways; the East Boston tunnel for street railways, etc. Submarine trolley and railway tunnels are now in process of construction from Staten Island to Long Island and to the New Jersey shore. The double tunnel of the Pennsylvania Railway, through the mud of the Hudson River, consists of two huge parallel tubes of boiler iron lined with concrete. The construction of such a tunnel presents great difficulty and danger. A huge nozzle or shield is advanced slowly, while workmen remove the earth and mud inside of it and build the tunnel behind it. The shield in which the men work is filled with compressed air, which prevents the inflow of water or mud that otherwise would fill the shield. Workmen suffer terribly from the effects of the air pressure and many lose their lives.

The use of the shield and metal lining of tunnels, as the shield is advanced, mark the modern development of the art of soft-ground submarine tunneling. The shield in crude form was first used by the English engineer Brunel in excavating the first tunnel under the River Thames, not far from the famous Tower of London. This enterprise was begun in 1825 and finished in 1843. The construction of the Mont Cenis Tunnel in Europe and the Hoosac Tunnel in the United States were facilitated by the use of power drills, the first used in tunnel work having been devised by one of the engineers of the Mont Cenis, which was built through the Alps to improve railway communication between France and Italy. Its length is 7.6 miles, and its construction occupied the years between 1857 and 1870. Compressed air as a motive power for rock

drills, air compressors, turbines and aspirators to draw the foul air from the excavation were also used in the Mont Cenis project for the first time in tunneling. Similar devices were used for the first time in America in building the Hoosac Tunnel, which was finished in 1875 and is 4.75 miles in length. On this tunnel, nitroglycerin and electricity for firing blasts, etc., were also used for the first time in America.

In the construction of tunnels beneath rivers, etc., the most modern plan is to sink steel tubes in a trench dredged out of the river bottom, and then surrounding and lining them with concrete. This method was used in constructing the Detroit River Tunnel, from Detroit to Windsor, Ont., which was completed in 1910. Its total length is 2,625 feet, the steel tubes having been sunk in ten sections. A similar method was employed in building the LaSalle Street Tunnel for street-car traffic beneath the Chicago River, and in other notable cases of recent tunnel construction.

The longest of the world's famous tunnels is the Simplon, between Switzerland and Italy, 12.25 miles in length, and the next longest the St. Gothard Tunnel, which also penetrates the Alps between those two countries and has immensely facilitated travel in continental Europe. The St. Gothard is slightly over 9.25 miles in length, and traffic through both the St. Gothard and the Simplon is now operated by electricity. Electric locomotives are used to haul trains and the recent innovation has added greatly to the comfort of travelers, by eliminating the smoke and gases from steam locomotives; although both tunnels possess a remarkably good system of ventilation designed to keep them free of smoke and foul air.

New York City possesses a remarkable system of tunnels or subways, as does the city of London, for the operation of underground railways, affording rapid transit to all parts of those cities. The New York tunnel system includes several tunnels under the North and East rivers, already referred to, and the latest project is for a New York-New Jersey vehicular tunnel, under the North River. The two states have arranged for the construction, maintenance and operation of this tunnel, to be paid for by each state in equal parts, and construction is now (July, 1923) under way. The project includes the construction of twin tubes, of 29 feet 6 inches external diameter, of cast-iron rings lined with concrete, providing for a 20-foot roadway in each which will be capable of caring for two lines of vehicular traffic, the north tube for westbound traffic and the south tube for eastbound. The plans provide for a narrow sidewalk in each tube for pedestrians and sufficient ventilation ducts and service conduits. The entire cost of the project is estimated at $30,000,000. Two electric power-houses have been erected for furnishing the compressed air and hydraulic power required in the work, and a blanket of approximately 600,000 cubic yards of clay and riprap was laid in the river bed for the protection of tunneling operations and the structure itself. Shafts were dug on either side of the river and the shields to be driven from the Manhattan and Jersey sides respectively were set up and the actual work of boring the tunnel began on October 26, 1922. The total length of the tunnels will be 9,250 feet, and the top of each tube will be 60 feet below mean low tide. The estimated annual traffic on completion of the tunnels will be 5,610,000 vehicles, and the advantages will include the quick and certain transportation of merchandise, foodstuffs and coal from the mainland direct to final destination in Manhattan, the Bronx and Long Island, unhindered by climatic or other conditions.

Tunny or **Tuna,** a large, handsome oceanic fish. It belongs to the mackerel family, but it reaches a great size, up to 1,500 pounds. The chief seat of tunny fishing is in Mediterranean waters off the coast from Spain to Sardinia. A tunny net costs several thousand dollars. It is made in the shape of a funnel. The tunny is driven into the narrow end and killed with harpoons. Tunny steaks have a ready sale in the fish markets of large cities. The tunny is related to the tarpon. It is taken off Santa Catalina Island, California, under the name of tuna. It is known also as the horse-mackerel.

Tupper, Sir Charles (1821-1915), a Canadian statesman, was born at Amherst, Nova Scotia, and was educated in Canada

and Scotland; he was a graduate in medicine of the University of Edinburgh. Returning to Amherst in 1843 he practiced medicine for twelve years.

Sir Charles entered politics in 1855, and defeated Joseph Howe for election to the Nova Scotia assembly. This was the beginning of a long and important career. In 1864 he succeeded to the Nova Scotia premiership, and it was due almost solely to his efforts that Nova Scotia joined the union. Howe went to England to secure the repeal of the Act of Union as it affected Nova Scotia, but Tupper, no less determined, followed, and was even more successful than he hoped to be, for he won Howe to the cause of confederation.

The Nova Scotia Free School Act of 1864 was the work of Tupper, who took his political life in his hands to accomplish that great reform. Courage was the keynote of his political career.

After declining a seat in the Dominion cabinet in 1867, Sir Charles was elected to the House of Commons. Resigning the Nova Scotia premiership in 1870, he entered the Dominion ministry; at the beginning of his service in this body he was President of the Council, but was made Minister of Internal Revenue in 1872 and Minister of Customs in the following year. In 1878 Sir Charles became Minister of Public Works in the second Macdonald ministry. In the next year a new department was created at his suggestion—the Department of Railways and Canals. He was put at the head of this department, and soon improvements on the Intercolonial Railroad, Welland Canal and the St. Lawrence River Waterway, were begun. It was due in part to him that the Canadian Pacific Railroad was built.

Sir Charles was sent to London in 1883 as Canadian High Commissioner; he stayed in London until 1895, but returned in haste to Toronto because of a crisis in the affairs of the Canadian Pacific. In 1896 he succeeded to the Dominion Premiership, but was defeated at the general election held a few months later on the "remedial legislation" having to do with the Manitoba "free school controversy." Until 1900, when he retired, he led the Conservative opposition.

chiefly to the Turks, Finns, Mongols, and Tartars.

Turanian, a name applied largely to designate a family of Asiatic languages and peoples. The word is derived from Tur, a legendary ancestor of the Turks. In European history the term is restricted

Turbine, a wheel designed to utilize the force of falling water or of a current of steam or air for mechanical purposes. The water turbine differs from the ordinary water wheel. The water wheel turns like a roller, its axis horizontal; the turbine whirls like a top, its axis vertical. The details of the turbine construction are too technical for description here. The turbine is set to form the bottom of a tube or well which is filled with water from above. The weight of the water column, at bursting pressure, causes the water to escape through the turbine and turn the wheel as it goes. There are different types of turbines. In one, the jets of escaping water drive the buckets of the turbine by reaction. When one jumps from a skiff toward the shore he gives the boat a send in the opposite direction. The reaction turbine turns in the opposite direction from the flow. In the second type or impulse turbine, the buckets are carried with the escaping jets and the turbine turns with the flow. Still a third turbine is turned by a combination of impulse and reaction.

The turbine does not require a water fall of great height. A large, slow wheel may be operated with a head, or fall, of even a foot. A water turbine in the Black Forest of Germany is cited as having a diameter of thirteen inches and driven by a water column 354 feet high. In 1905 powerful turbines were installed at Niagara Falls. Ten turbines are driven by water delivered by ten steel tubes or penstocks seven and one-half feet in diameter and 136 feet high. Each turbine is fitted to a vertical steel shaft that weighs 150,000 pounds. The pressure of the water to escape is so great that these seventy-five-ton shafts are buoyed up till there is virtually no friction in the bearings in which the lower ends of these monstrous vertical axes are pivoted.

Steam turbines have been known ever since the day of Hero the Alexandrian. During the latter half of the nineteenth

century, the steam turbine was developed. In 1894 it was applied successfully to the navigation of ships. The steam, escaping through nozzles, acts on the curved vanes of the turbine, producing a powerful circular rotation. As compared with the steam engine, with its cylinder, valve, and piston, the steam turbine requires less space, is lighter, is less likely to get out of repair, is safer, costs less to install, weighs less, does more work, works more rapidly, requires less fuel and less attention, runs with less jar, and does not need as heavy shafting or as large a propeller. Turbine liners began to cross the Atlantic in 1905.

Turbot, a favorite table fish in European cities. The European turbot weighs from five to ten or even fifty pounds. It is what is known as a flatfish, a term applied also to the sole, flounder, and halibut. Its body is flattened like that of a sunfish only more so, and is surrounded almost entirely by a continuous dorsal and anal fin. The head is twisted so that both eyes are on one side. It swims on one side; the upper side is dark, the lower side light colored. One would naturally take the lower side for the belly and the upper side for the back; but this is not the case. One gill opening and a fin are on the lower side. A careful examination of the fish reveals the fact that the entire digestive tract—the "insides" of the fish—are within an inch or two of the head, and that the apparent body is a widely lobed tail. The turbot is one of the finest table fishes. It feeds on clean sandy bottoms, and is caught according to season with trawl net or hook and line. The London markets dispose of fresh turbot and lobster sauce to the value of a million dollars a year. See FISH; FLOUNDER.

Turgenieff, or **Tourgenieff, Ivan,** ē-vän′ toor-gan′yef (1818-1883), a Russian novelist. He received his education at Moscow, St. Petersburg, and Berlin, imbibing at the latter university, no doubt, opinions of a more democratic character than were prevalent in Russia. On his return to his native land Turgenieff was appointed to a position in the ministry of the interior but he soon got into trouble through writings that displeased the authorities. The reader will not be interested in the various imprisonments and banishments to which the novelist was subjected. He died at Paris. Among the more noted titles in the list of his works we may mention *A Nest of Nobles, Virgin Soil,* and *Father and Sons.* Turgenieff was the first to use the word "nihilist" in its present sense. He was for a time a leader of the radicals, but latterly he was accused by them of falling away. In his early years he exerted a strong influence in favor of the liberation of the serfs. His service to literature consists in realistic pictures of Russian peasantry, a subject in which he showed himself at home.

Turgot, tür-gō′ (1727-1781), a French minister of finance. He is said to have descended from a Scottish family long settled in Normandy. He intended at first to become a priest, but turned from the service of the church to public life. In 1761 he was made intendant of the department of Limoges, a position he held for thirteen years, to the great relief of the peasantry. In 1774 Louis XVI, being in distress, made him minister of finance. Turgot immediately set about reform. He held office but twenty months. Six of these were occupied in putting down peasant insurrections organized by his opponents, the nobility, and six precious months were spent ill in bed, yet Turgot left a reputation for work accomplished. He abolished the custom of forcing the starving peasants to build roads and carry military supplies for nothing. He allowed peasants and dealers to sell their grain without paying taxes at the town gate. He cut down the frivolous expenses of the court, and cut off many pensions. "No bankruptcy, no increase of taxation, no borrowing," said he to the king. The clergy and nobility whom he prepared to saddle with a part of the burden carried by the peasants were too much for him, however. Turgot was dismissed from office in 1776. He was an able financier, a man of truth, unselfishness, and fidelity. It is sufficient to say that if he had been kept in office, and if his plans had been carried out, the economic reforms of the French Revolution would have taken place by degrees and without bloodshed. He had no idea, however, of a government by the people; his ideal was government for the people by a beneficent despot.

Turin, a city of northern Italy. It was formerly the capital of the Piedmont state, and is regarded as the most modern large city in Italy. Charlemagne had his capital here until 1032. Turin is laid out in squares. It possesses a university and cathedral, castle, tower, hall, royal palace, academy of sciences, museum of antiquities, etc. Victor Emmanuel and Cavour were born here. Turin had a population of 451,994 in 1920, in size the fourth city of Italy. There are large manufactures of silks, gloves, paper, leather, soap, tobacco, jewelry, furniture, pianos, and machinery. The city is growing rapidly. See ITALY; PIEDMONT; CAVOUR.

Turkestan, tōōr-kĕs-tän′, a large region in Central Asia, reaching from Tibet on the east to the Caspian Sea on the west. Western Turkestan belongs to Russia. It includes Khiva, Bokhara, and other states. The population is about 6,000,000. The capital is Tashkent. Through the construction of the Trans-Caspian Railway, it has been made accessible by way of Russia. Caravan transportation has, in part, been supplanted by the railroad. Wheat, rice, melons, grapes, fruits, and cotton, as well as productions of the herd, are exported in considerable quantities. Eastern Turkestan, lying between Tibet and western Mongolia, belongs to China. It has an area of half a million square miles and a population somewhat in excess of a million. It is an elevated desert plateau,—a western extension of the desert of Gobi. Oases and irrigated tracts along the rivers produce cotton, tobacco, and hemp. The oriental rugs of this section are celebrated for their beauty and durability. The soft, glossy black, curly fur known as Persian lamb comes from the flocks of the Turkestan shepherd. At six months of age the skin of a lamb is worth from two to ten dollars. Kashgar is the capital. The main eastern and western caravan route of central Asia passes through Turkestan. Unlike the people of Tibet and Mongolia, the people are Mohammedans of Turkish race and speech.

Turkey, (formerly the Ottoman Empire), a state lying largely in Asia Minor and partly in Europe, the European territory extending west as far as the Maritza River. Though in 1923 the boundaries were still indeterminate, they are roughly as follows: North, the Black Sea and Armenia; east, Persia, Mesopotamia (Irak) and Arabia; south, Palestine and the Mediterranean Sea; west, the Maritza River. Before the World War the area of the Ottoman Empire was about 725,000 square miles and the inhabitants numbered approximately 21,273,000; but, owing to the redetermination of boundaries consequent upon Turkey's defeat as Germany's ally, the area was estimated at 247,650 square miles and the population at 13,302,300.

THE PEOPLE. The old empire had an extremely heterogenous population, and except in the heart of Asia Minor the Turks formed a numerical minority. The present Turkey presents almost the same ethnographic complexity, but because of the loss of large groups of nationals after the Balkan and World wars, the Turko-Tartar element is dominant. There are a number of large cities, but the ancient cities of Damascus and Bagdad have been lost. New Turkey has two capitals, Constantinople and Angora, with 1,000,000 and 38,000 inhabitants respectively. The bulk of the population follows Mohammed.

AGRICULTURE is the leading Turkish industry, but the fertile soil of the country is not exploited to anything approaching its full productiveness. Some of the land is well watered and some of it needs irrigation. The Turkish farmer, however, has done little toward properly irrigating the soil, due largely, it must be said, to the fact that under the old regime he was so heavily taxed that he had little interest in producing more than he and has family needed.

The most important crop is tobacco. Turkish tobacco is of high quality, is known all over the world, and always commands the top price. Wheat, corn, flax, cotton, grapes, figs, nuts and opium poppies are also grown. A recent estimate gives 16,567,000 acres as the area under cultivation in Asiatic Turkey.

MINING. The mineral resources of the country are very extensive, but have never been developed sufficiently to play an important part in the national economy. Copper, petroleum, chrome ore, silver, zinc, coal and lignite, borax, antimony, gold, salt, emery and manganese are found.

Fisheries. With seacoasts north and south and the Dardanelles to connect them, the Turkish fisheries are important, and under proper economic conditions may become more so. The crudest and most antiquated methods of fishing are followed. Pearls, mother of pearl and sponges add greatly to the total value of sea products.

Manufacture is but little developed and is extremely promitive. Woolen yarn, carpets, cotton goods and rugs are almost the only manufactures that the outside world ever sees, all other articles being made for home consumption.

Transportation and Commerce. Turkey's export trade is not large, amounting to about $95,000,000 in a recent and typical year. Tobacco, wool, raisins, opium, carpets and figs are the leading exports; coal and coke, metal ware (tools, etc.), machinery and cotton yarn are the important imports.

Turkey has slightly more than 3,700 miles of railroads. That part of the Berlin to Bagdad road that runs through the present Turkey, and the Oriental Railroad, are the most important. The highways of the country are few, and a large amount of carrying is done by camel caravan. The country has some 1,800 post offices and about 29,000 miles of telegraph lines.

Education. Elementary instruction is compulsory for all children, but the laws governing attendance are not strictly enforced. Exclusive of the University of Constantinople, founded in 1900, there are more than 36,000 schools, with an enrollment of more than 1,330,000.

Government. Though nominally governed by a parliament divided into two chambers and otherwise drawn on western lines, the *de facto* government of Turkey is the Grand National Assembly, established by Mustapha Kemal in 1920; it sits at Angora. After the abdication of the sultan in 1922, a caliph without political power was elected, with headquarters in the old capital, Constantinople.

History. The Mohammedan Turks first appeared in Asia Minor at the time of Genghis Khan's great drive westward in the first half of the thirteenth century; formerly they lived farther east in Asia. The founder of the Ottoman Empire was Osman, or Othman (1288-1326). He was a brilliant, aggressive leader; his son and successor, Orkhan, displayed the same characteristics as his father, and was the first to gain a foothold in Europe, when he took Gallipoli, 1354. The successors of Orkhan further extended Turkish dominion in Europe, subduing Serbia, Bulgaria and Macedonia. In 1453 Mohammed II took Constantinople, thus putting an end to the Byzantine Empire. Mohammed fought to extend Turkish dominion farther westward in Europe, and though he failed, the empire flourished until the end of the sixteenth century. Carelessness born of power resulted in a gradual but steady loss of territory and decline of influence. The Turkish forces were successively defeated by the land or sea forces of Spain, Venice, Austria and Russia. Later, in the early nineteenth century, Greece revolted, freeing herself from Turkey in 1821. At the close of the Russo-Turkish war of 1828-29, Turkey was shorn of more territory. Between 1877 and 1896 more conflicts occurred, and at the opening of the twentieth century Turkey was little more than a shadow of its fifteenth century self.

The Twentieth Century. Until 1909 the government was an absolute monarchy. The ruler was known as the sultan. His will was supreme, except that he was guided by the precepts of the Koran and the laws of his predecessors. He maintained a harem at Constantinople. At the death of a sultan he was succeeded ordinarily by the oldest living male born in the harem. Thus the successor may be an uncle, a brother, or son of the dying sultan. The women tions by ownership of a majority of the of a harem came chiefly by purchase from Circassia. No regular marriage was deemed requisite. All children born in the harem had equal rights. There was and is no nobility. The humblest citizen of the empire was eligible to the highest office in the gift of the sultan.

In 1909 a political party known as the Young Turks forced the sultan, Abdul Hamid, to grant a constitution; 42,000 political prisoners were set free. Later, finding the sultan treacherous, they deposed

him and elevated an older brother, Mohammed V, to the throne. He had been kept under surveillance, a gilded prisoner, for 33 years.

The old sultan was required, as the price of his life, to surrender vast hoards of money. His harem was disbanded. The Young Turks announced a program of progress. They proposed the abolition of polygamy, genuine religious toleration and free education. If this program had been carried out there might have been prosperity ahead for Turkey and for the Turk. Several thousand officials of the Hamidian period were dismissed or pensioned. New governors were appointed to many provinces. The reorganization of the ministry of finance, and the appointment of a finance commission, including a number of the European officers formerly engaged in Macedonia, promised the best results. The army was overhauled, old Hamidian officers being sent down, even a commander being reduced to the rank of colonel. The throwing open of the army to non-Mussulmans and the appointment of several Christian governors to Mohammedan provinces were other courageous steps that were to justify the confidence with which Europe saw the rise of the Young Turks to power. But the Young Turkish party bitterly disappointed those who based their hopes upon it. It lent itself to political intrigues more reprehensible than those of the Sultan it dethroned. It offered a glad hand to Germany in her scheme to gain dominion over the Near East.

Entering the World War on the side of Germany, Turkey hoped to win back some of the territory lost in the Balkan War (which see). But when Germany went down to defeat, Turkey went with her. Her territory was materially reduced by the Treaty of Sevres in 1920 and a large part of her former territory was ceded to Greece, some of it to be administered by her under Turkish sovereignty. If it appeared at that time that the Near East situation was clearing up, the Nationalist revolution of 1920 put an end to the hopes of the western world.

The Young Turkish revolution of 1908 was confined closely to Constantinople, but the 1920 revolution had all of Asia Minor for its scene. The nationalistic spirit, borrowed from Europe, added to the age old religious differences of Christian and Moslem, made a bad situation worse. The Turks, under their brilliant leader, Mustapha Kemal, advanced upon the Greeks throughout Asia Minor. Blundering and bad faith on the part of the allies further complicated the problem.

Before the opening of the Genoa Conference, the Turkish representative in Italy of Mustapha Kemal's Angora government made a strong demand upon the allies for recognition, saying that if the world wanted peace, Turkey must be heard.

The Greeks are supposed to have underrated both the strength and earnestness of the Kemalist forces, with the result that the Turks drove westward, putting the Greek forces to utter rout The Turks-Allied peace treay was signed on July, 24, 1923.

STATISTICS. The following statistics are the latest to be had from trustworthy sources:

Area, square miles	247,650
Forest area, acres	21,000,000
Population	13,302,300
Chief Cities:	
Constantinople	1,000 000
Brussa	110.000
Sebasteia	65 000
Trebizond	55,000
Kaisarieh	54 000
Konia	45,000
Bitlis	40 000
Diarbekr	38 000
National revenue	$170,000,000
Bonded indebtedness	$855,000 000
Tobacco, pounds	4 600 000
Silk cocoons, pounds	2,800,000
Domestic Animals:	
Horses	630.000
Mules	85 000
Asses	825 003
Camels	95,000
Cattle	4,118.000
Sheep	11,200
Goats	2,065 000
Borax, tons exported annually	7,000
Iron ore, tons annually	40 000
Silver, pounds annually	5,200
Antimony, tons annually	308
Coal and lignite, tons annually	400,000
Fisheries products, value	$1,250 000
Woolen yarn, pounds annually	2 750.000
Imports	$365,000 000
Exports	$95,000,000
Miles of railway	3 720
Number of schools	36 230
Pupils enrolled	1,331,200

See GREECE; KEMAL, MUSTAPHA.

Turkey, a large bird allied to the peacock, pheasant, and Asiatic jungle fowl, hence to our common barnyard fowls. There are five wild turkeys, all American—one in Yucatan and four in Mexico and the United States. The wild turkey of most writers is a bird of the Eastern States. The Florida turkey is somewhat smaller. The Texan turkey and the Mexican turkey, from which the domestic breeds of Europe are derived, complete the list.

A few scattered flocks of the common wild turkey are yet to be found in the forests of a wide range extending from Wisconsin and Texas to the Atlantic, but they are confined chiefly to the Alleghany Mountains. Except when nesting, wild turkeys

In America a roast turkey with cranberry sauce is the traditional center of the Thanksgiving dinner. To supply this demand there are about 9,000,000 turkeys in the United States, but they are rapidly disappearing. Turkeys raised by Europeans among the foothills of the Himalayas for the Calcutta market are sold at the Christmas season for $5 and even $10 each.

In the United States there are six standard varieties,—the bronze, Narragansett, buff, slate, white, and black. The chief differences are in size and color of plumage.

Turkey Red. See MADDER.

Turner, Joseph Mallord William (1775-1851), a celebrated English landscape painter. He was the son of a London hairdresser. He was employed when a boy to color engravings. He became a painter of rivers, the sea, ships, and landscapes. His work was applauded warmly by Ruskin. Several hundred illustrations were prepared for publication under such titles as *South Coast Scenery, England and Wales, Rivers of France,* etc. Among his best known paintings are the *Fighting Téméraire, Towed to Their Last Moorings, The Sun Rising Through a Mist,* and *The Slave Ship.* He was an eccentric man and never married. He was wont to disappear from view, going on a tramp for months alone. At death he desired to be wrapped in the canvas of the painting known as *The Building of Carthage,* now in the National Gallery, London. He was buried in St. Paul's hard by Sir Joshua Reynolds.

Turner, Nat (1800-31), a Virginia slave. He became possessed of the idea that the voice of God was calling him to lead his people to freedom. In 1831 he started an impossible insurrection. Several families of whites were massacred. He went from plantation to plantation, killing whites and increasing his following until he had two hundred half crazed negroes at his back. Fifty-five white people had been butchered before troops were obtained to suppress the rising. Turner took refuge in the Dismal Swamp, but was taken finally and hanged. The heads of sixteen of his fellow insurgents were fixed on poles along the highways as a warning. The terror created by the insurrection was such that leading Virginians seriously considered the question of general emancipation.

Turnip, a biennial plant of the mustard family. It is related closely to the cabbage. There are two well marked types, the flat rooted and the long rooted. Very possibly both are variations of the same plant, but the American custom of calling the former a turnip and the latter a rutabaga or Swedish turnip is a convenient one, and is followed by botanists. The grower sows turnip seed late in the spring. A tuft of succulent leaves and a full sized root are produced the first year. Seed stalks and seed pods are produced the second season. Both the turnip and the rutabaga are natives of the warmer or temperate parts of Europe or Asia. In these regions the mature root sheds the leaves on the approach of winter and rests till spring. Several seed stalks then shoot up, branch widely, and bear flowers, succeeded in midsummer by long, knotted, mustard-like pods containing brown or black seeds. The plant then dies. In the cold climates it is necessary to take up the roots and protect them like potatoes from frost. Occasionally a rutabaga will stand through the winter, thaw out in the spring, and grow. Rutabagas play a large part in the fattening of cattle in northern Europe where the summers are too cool to mature Indian corn. In well prepared soil 1,000 bushels of roots, "neeps," the Scotch call them, are not an uncommon yield per acre. The flea-beetle is the turnip's greatest insect enemy.

Turnstone, a bird of the snipe kind. It is a shore bird. It gains its name from a habit of running along the shore of the sea turning stones over with its bill in search of insect food. Several distinct species are found along the seashore everywhere. Some of the local names are surfbird, calicoback, maggotsnipe, tanglepicker, chuckatuck, jinny, etc. The turnstone is closely allied to the plover and the sand piper. See SNIPE; SANDPIPER.

Turnverein. See JAHN.

Turpentine, an oily, resinous substance contained in the bark and wood of coniferous trees. It is used in medicine, but chiefly in the preparation of paints and varnishes. French turpentine is obtained from the maritime pine of the dune district along the Bay of Biscay. Russia and Germany obtain it from the Scotch pine. It is produced also in Austria, Corsica, the East Indies, and Japan.

To keep a standard still in continuous operation during the turpentine season requires a farm of about 4,000 acres of dense pine forest. Such a forest is divided usually into twenty lots of about 10,000 boxes each. The crude turpentine is collected from the lots in regular rotation. The resin left behind in the still is drawn off through a tap, and packed in barrels. It is the rosin of commerce. It is used in the manufacture of varnishes, with tallow in making common candles, by the violinist for rubbing on his bow, by the plumber and tinman in making joints, and in many other ways.

Each year the south Atlantic states of the United States produce about 50,000,000 gallons of turpentine, and about 5,000,000 barrels of first grade resin. Of the total amount produced, about one-half is exported to Europe, chiefly to London, Hamburg, and Antwerp. Charleston, South Carolina, was formerly the chief port of export, but the destruction of the pine forests by wasteful methods of collecting the sap has driven the industry southward into the territory tributary to Savannah, Brunswick, and Pensacola.

Turquoise, tŭr-kois′, a precious stone much used as a gem. It is composed chiefly of aluminium. The blue turquoise owes its color to the presence of a phosphate of copper. A trace of iron gives a greenish tint. It is found in veins. It is not a crystal. Large pieces are rare. The color fades on exposure to strong light. It is softer than the topaz—four points softer than the diamond.

Turtle. See TORTOISES, TERRAPINS, AND TURTLES.

Turtle Dove. See DOVE.

Tuskegee (tŭs-kē′gē) **Normal and Industrial Institute,** a school for the education of the negro. It was founded by Booker T. Washington in 1881 at Tuskegee, Alabama. Washington began with a hundred acres of pine land and a small cabin. The first students built their own cabins and cleared the land. Later, both the state and nation granted aid. The institution also received large donations from philanthropists. The present property is worth half a million dollars. There are 200 instructors and over 1,700 students, all colored. There are 2,631 acres of land and over 60 buildings. The aim of the school is to train colored teachers, farmers, housekeepers, and mechanics, and especially to teach the value and the dignity of labor. So far as practicable students are enabled to work their way. The best account is to be gained from Washington's autobiographical work, *Up from Slavery*, and a later volume, *Tuskegee and Its School.*

Tussock Moth, a grayish-white moth about an inch in length, the females in some species being without wings. The caterpillar is a delicate green in color, with brush-like tufts of hair on several of the segments. The caterpillars feed upon the leaves of fruit and shade trees and are very destructive. The larva turns into a wooly, whitish chrysalis about September, and the following spring emerges as a moth. Some twenty varieties are found in the United States. Two of these, the brown-tail and the gypsy, were imported for purposes of experiment. They have become devastating pests, being capable of ravaging whole orchards. Originally, they were largely confined to sections in New England, but have spread to other parts of the country. Another variety, the white moth, has also caused much damage throughout the United States. See GYPSY MOTH; BROWN-TAIL MOTH.

Twain, Mark. See CLEMENS.

Tweed, William Marcy (1823-1878), a New York politician. His father, whose trade he learned, was a chairmaker. Tweed became influential in local politics through popularity as a fireman. He served as an alderman and as a congressman, as deputy street commissioner, and as commissioner of public works. He became "boss" of Tammany. He was noted for letting corrupt contracts for paving and other city improvements. He began a courthouse to cost $250,000 and spent $8,000,000 long before it was completed. The New York police service became affiliated with crime in every form. Thieves and gamblers were protected. Tweed and his ring stole enormous sums from the public treasury. He was pushed hard by such papers as the *Times,* and *Harper's Weekly.* In 1873 he was convicted and sentenced to the penitentiary, but was set free by the higher courts. Civil suits were then instituted to recover the sums taken from the treasury. He was held in jail because unable to furnish $3,000,000 bail. Before the suit was concluded, he escaped to Cuba but was arrested and brought back. Pending his trial he died in Ludlow Street jail. Tweed's name is synonymous for dishonesty in public affairs. See TAMMANY; NAST, etc.

Twin Flower. See LINNAEUS.

Tyler, John (1790-1862), the tenth president of the United States. He was born at Greenway, Virginia, March 29, 1790, and died at Richmond, January 18, 1862. He was graduated at William and Mary in 1807, and two years later was admitted to the bar. He was from the first a public man. In 1811 he was elected to a seat in the legislature of Virginia, a position which he held for several terms. He served his state as governor and in both houses of Congress. In the latter capacity, he opposed the United States Bank and the tariff. He supported John C. Calhoun in his nullification movement, but was an ardent follower of Henry Clay in various compromise measures. In 1829 the Whigs, desiring to offset William Henry Harrison with a vice-presidential candidate whose views would be acceptable to old-time Southern Democrats, nominated Tyler. The candidates were pledged to a less arbitrary exercise of authority. The famous "log-cabin" campaign was conducted with the war cry of "Tippecanoe and Tyler too." The Whigs carried the day, but Harrison survived the cares of office only a month. The vice-president had become known facetiously as "His Superfluous Excellency," and Congress hesitated as to the proper manner in which to declare a vice-president advanced to the presidency. President Tyler, however, cut the Gordian knot of procedure by taking the oath of office, declaring himself president, "By the Constitution, by election, and by the hand of God." He retained Harrison's cabinet and started off in full accord with his party. Soon after, however, he felt called upon to veto two successive Whig measures for the reëstablishment of a national bank. The Whigs repudiated him. His cabinet, save Webster, resigned. A handful of congressmen dubbed the "Corporal's Guard," stood by him. At the close of his term of office he retired from public life. At the opening of the Civil War he sided with his native state. See PRESIDENT.

Tyler, Moses Coit (1835-1900), an American historian and writer. He was born at Griswold, Connecticut. He was educated at Yale and Andover. He held various pastorates in the Congregational and later in the Episcopal church. He was professor of English literature in the University of Michigan, 1867-81, and professor of American history in Cornell from 1881 to the time of his death. He wrote several textbooks. He is known best by his *History of American Literature,* a work of conceded charm and thorough scholarship.

Tyler, Wat. See WAT THE TYLER.

Tyndale, tĭn′dal, **William** (1484-1536), an English reformer. He was educated for the priesthood at Oxford and Cambridge, and was for a time chaplain to a nobleman in his native Gloucestershire. He went to London and thence to the continent to secure freedom to bring out an English translation of the New Testament. He came into sympathy with the German reformation and visited Luther at Wittenberg. He began to print at Cologne but was driven out. He then took refuge at Worms and translated the New Testament and the books of Moses from the Greek into

English. The details of his life are known imperfectly, but he is known to have lived at Antwerp. Finally he was arrested at Brussels, tried for heresy, strangled, and burned at the stake. A fragment of the Cologne edition of Tyndale's *Testament* is preserved in the British Museum. The Baptist college at Bristol, England, preserves an entire copy of the Worms edition. Copies of later editions issued at Antwerp are literary treasures. Tyndale's translation was used as far as it went in the preparation of the King James Bible, the authorized or common version. Tyndale's object in life is expressed by his reply to an abusive clergyman: "If God spare my life, ere many years I will cause a boy that driveth the plowshare to know more of the Scriptures than thou dost." See BIBLE; WYCLIF.

Tyndall, tĭn'dal, **John** (1820-1893), a British student of physics. He was born in Ireland. He was educated for engineering, but forsook the business for an instructorship in a college at Hants. He studied at various German universities. He became a member of the Royal Society in 1852. With Huxley he investigated the phenomena of glaciers in Switzerland. He did much to make the movements of glaciers understood. He was a popular writer and lecturer on light, heat, sound, forms of water, and electricity. In 1872-3 he visited the United States to deliver a course of lectures on light. His writings fill a score of volumes. See HUXLEY; FARADAY.

Type, a right-angled, prism-shaped piece of metal, wood, or other material, having a raised letter or character on one end, used in letter-press printing. The raised end is called the face. A groove is cut across the opposite end to enable the type to stand erect more readily. One or more nicks across one side of the body, near the bottom, enable the typesetter to set his type right side out and up without looking at the face. As compared with an engraved plate, pieces of this sort, designed to be set together to form a page, are called movable type. The first type were cut in wood and, indeed, wooden type in the large sizes are still much in use for job printing, but ordinary type are now cast from an alloy consisting of three parts of lead, one part of antimony, and a slight addition of copper and tin. Linotypes make letters as they are set.

There are many styles of type. Some of the styles in general use other than the regular body letter are the gothic, antique, Jensen, De Vinne, script, typewriter, etc. A complete assortment of the characters of a particular size and style is known as a font. Typefounders sell usually by weight. In a font of 1,000 pounds it is customary to allow 514 pounds for Roman lowercase, 86 for capitals, 20 for small capitals, 40 for figures, 28 for points, 85 for spaces, 122 for quadrats, 5 for fractions, 73 for italic lowercase, 23 for italic capitals, and 4 for reference marks, etc. There are about 200 different characters in a full font. Then, too, there is more need of some letters than others. Printers used about 60 e's, 40 a's, 15 m's and 32 h's to 1 z. The different sizes of type were formerly known by names as Brilliant, Agate, etc., but they are now designated by the number of points, a point being 1/72 of an inch.

Agate	5½-point
Nonpareil	6 -point
Minion	7 -point
Brevier	8 -point
Bourgeois	9 -point
Long Primer	10 -point
Small Pica	11 -point
Pica	12 -point
English	14 -point
Great Primer	18 -point

A font contains letters of one size only, and may weigh from one or two pounds upwards. What is known as job type, used for display, is generally put up in the smaller fonts. Job fonts are ordinarily arranged in series. Thus a complete series of Jensen or De Vinne would comprise fonts of 6-point, 8-point, 10-point, 12-point, etc., up to 72-point. A well equipped office requires many different fonts and frequently several fonts of each size. For use, type are distributed in "cases" which have a box for each character. A separate case is required for type of each size. The body of this book is printed in 10-point of the style known as old style Cambridge. The extracts are in 8-point of the same series.

See PRINTING; ALLOY; STEREOTYPING; LETTERS.

Typesetting. See LINOTYPE; TYPE.

Typewriter, a machine for printing correspondence, legal documents, bills, receipts, and other forms of manuscript. There are many makes. Although they are alike in general construction, there are two distinct classes of machines, the basket machine and the cylinder machine. The Remington is one of the earlier and more prominent of the basket machines. The Hammond may be regarded as a representative of the cylinder machine.

In the first or basket machine the paper passes over a vulcanized rubber roller. A type for each letter of the alphabet is affixed, hammer fashion, to the end of a narrow lever. The levers are pivoted in a frame. The free ends are arranged in a sort of keyboard, with small, circular keys, of which the action and fingering are somewhat like those of a piano. By striking the keys one by one with the tips of the fingers, the hammer-like types force an inked ribbon against the paper and print their letters on it. The types strike at precisely the same spot, but as each key is struck it releases a traveling frame in which the roller and paper are held. A spring carries the frame and paper one space to the left so that the next letter appears in its proper position. A blank key is struck to space between words.

The cylinder machine is constructed on a somewhat different principle. The type are all fixed in a cylinder. The keys cause the cylinder to revolve, so as to bring the characters into position. The paper is struck by a little hammer. A ribbon travels between the paper and the cylinder of characters. Each type of machine has its advocates. Punctuation marks are, of course, provided and, on the more complete machines, keys for the various signs used in billing and in business correspondence. By arranging sheets of paper with alternate sheets of carbon paper several duplicates may be struck off at one writing. All machines in general use have a standard keyboard. Typewriters are made with keys bearing the alphabets of many languages. The Arabic machine requires eighty-four characters.

A patent for a writing machine was issued in England as early as 1714. An ingenious Frenchman devised something of the sort in 1784. The first American machine was patented in 1843. The first machine to combine lightness of touch, speed, and accuracy was the Remington. It may be said to have become an assured success in 1873. Typewriters were introduced slowly, but their use is now general. It is not unusual to see from twenty to five hundred machines at work in a single counting room.

The manufacture of typewriters centers chiefly in the United States. About three out of every five American-made typewriters are produced in the state of New York. The city of Syracuse may be considered the world's center of the indus ry. Many improvements have been made, the greatest consisting in making the writing visible. The portable machine, weighing from eight to ten pounds, has become popular for use on the road. Many machines are expor'ed. Our best customers are naturally the nations having the largest business interests, —the United Kingdom, Germany, France, and Russia, but shipments are made to every commercial city in the world.

Typhoid Fever, an infectious disease. It is due to a poison produced in the system, particularly in the alimentary canal, by a horde of one-celled, microscopic plants known as bacteria or bacilli. The typhoid bacillus was discovered by the German Eberth in 1880. The bacilli are so small that from 8,000 to 25,000 placed end to end measure only an inch. The length is about twice the width. Seen under a powerful microscope, the typhoid bacilli are said to look like links of sausage, furnished each with a dozen twisted arms or hairs. These arms, called flagella, because they whip about, enable the bacillus to move rapidly in a liquid. The natural home of these typhoid germs is in man. They pass by the million in the body wastes of every typhoid patient; they are capable of living for a time and of multiplying in water, milk, many kinds of food, and in certain soils. They gain access to new victims only through the mouth. A person may be in the midst of typhoid and wait on typhoid patients without danger, so long as he neither eats nor drinks, or so long as he can be sure that his food and drink contain no typhoid germs. There are a thousand avenues by which the typhoid germ may

approach, but all pass through the mouth.

Milk is a carrier of germs. A case is cited of a dairyman's wife who nursed a neighbor in an attack of typhoid fever, but conveyed the germs on her hands to her husband's milk cans and sent the fever to thirty-nine of his customers. Once the typhoid bacillus gets into milk, it multiplies with rapidity. An English scientist devised a method of noting the increase. He started with a small colony of 78 germs; in twenty-four hours they had increased to 6,000 and in another twenty-four hours they numbered 10,000,000. In a week he computed the number on hand at 440,000,000. Milk may be frozen and churned without seeming injury to the typhoid bacillus. The only way to exterminate it in milk is to boil the milk and then seal it up to prevent new germs from getting in by means of dust or flies. It is thought that a bacillus colony is capable of living in milk and milk products for a month or six weeks before dying out.

Drinking water may carry typhoid germs. It may be clear, sparkling, and icy cold, and yet be infested by the germs of typhoid. One spring the disease broke out in the mining town of Plymouth, Pennsylvania. Out of 8,000 people, over 1,000 were down with the fever; business came to a standstill; 114 lives were lost; in direct expense and wages the miners suffered a loss of $100,000. The town was supplied with water from a clear mountain stream. Nobody suspected the drinking water. Investigation revealed the fact, however, that a lone camper in a cabin on the banks of the stream among the hills had fought with typhoid fever during the dreary weeks of winter. He had thrown the wastes out on the snow. When the spring thaws came the germs had been washed into the stream where they multiplied, with the result stated. A privy used by persons having typhoid fever overhung a brook in Lowell, Massachusetts. The use of water thus contaminated caused a thousand deaths. For the reasons named, city authorities pay attention to the shores of the reservoirs from which water is obtained. The bacilli flourish in running or open water from six to ten days. If they do not reach a human host by the end of that time they die out. Well water is a frequent source of infection. If a well be situated near a privy or place where wastes are thrown, the germs are likely to seep through the ground into the well and contaminate the water. Many a neighborhood epidemic has been traced to the use of water from a contaminated well. If there is the slightest reason to doubt the purity of water, it should be boiled before it is used for drinking purposes. In 1891 the death rate from typhoid fever in the city of Chicago was 160 per 100,000 people. In 1895, after the completion of the drainage canal, the typhoid rate sank to 16 per 100,000.

Physicians have traced typhoid fever to the use of celery and lettuce from a garden where the soil has been contaminated. They have shown that, while the germs die in about four hours if exposed to sunlight, they live for months in the upper inch of moist soil. Oysters taken from river beds into which the discharge from sewers finds the way, are a dangerous source of typhoid fever. Army physicians traced an outbreak of typhoid fever on board a training ship in the Thames River to a bale of blankets that had been used in a typhoid camp in the Boer War six months before.

Fingers, dust, and unwashed utensils are the means of carrying the typhoid germ to our food, but the common domestic fly is said to be the worst agency of all. Let the house flies gain access to the germs from a typhoid patient and they will spread them all over a camp or town. The pests walk in filth, eat filth, fly everywhere, tramp over food, dip their polluted mouths into food, and drop flyspecks on food everywhere. An examination of a single flyspeck has revealed the presence of thousands of germs. Authorities are emphatic in saying that all litter, manure, filth, or refuse in which flies can lay their eggs and rear young should be cleaned up to prevent the appearance of midsummer swarms; that screens should be used to prevent flies from approaching the patient, and that the wastes of a fever patient should on no account be exposed to flies. A neglect of these precautions subjected 22,000 American soldiers to infection during the Spanish-American War and cost the lives of 2,000 men.

If, then, the typhoid germ multiplies so rapidly and is communicated so readily to

food and drink the wonder is that anyone escapes. Fortunately the body is not helpless. The white corpuscles of the blood are the scavengers, the health patrol, of the body. The white corpuscle and the typhoid bacillus are enemies. The typhoid germs either attach themselves to the white corpuscle and begin to feed on it, to transmute its material into a host of bacilli or bacteria by which other corpuscles are absorbed, or else they produce a poison or toxin which destroys the white corpuscles. On the other hand, the white corpuscle in some way has the power of destroying bacilli. A battle goes on; if the corpuscles win the fight, as they generally do, the person knows nothing of the danger he has escaped. If, for any reason, the bacilli win, the patient comes down with fever; his blood becomes thin, his temperature rises, the flesh wastes away, and the germs run riot in the body, pervading even the spittle and the perspiration. If outbreaks of bleeding, or of ulcers that eat holes in the intestines, do not cause death, the system rallies and in a way not understood, seeing that the white corpuscles have been destroyed, begins to produce a toxin that destroys the bacilli. In from four to six weeks, if no relapse takes place, the patient may hope to be on foot again. The anti-bacillus toxins appear to remain in the system and to render the person immune for a time. Strangely enough, young, strong people, persons whose blood dances through the veins in the exuberance of health, suffer most from typhoid fever. According to the United States census the number of deaths from typhoid fever in 1920, within the registration area, was 6,508, or 7.8 for each 100,000 people. The registration area comprises those states and cities in which the death record is kept with care. It includes 63,659,441 people.

To summarize, the home of the typhoid bacillus is the intestinal canal of man. It lives and multiplies for a time, — hours, days, weeks, and even months,—in milk, water, soil, or cesspools, and it may exist for a long time in dust, but, except in man, it finally loses its vitality. If new cases of typhoid fever could be prevented for a few months the scourge would disappear. All cases are due to eating or drinking or possibly to breathing germs. Typhoid fever is due, to speak plainly, to eating or drinking human filth in microscopic quantities. Sanitation — keeping body wastes out of our food and drink—is the cure. The prevalence of typhoid fever in lumber camps, military camps, and in new settlements, is due to filthy conditions and want of sanitation—nothing else.

Typhoon, tī-fo͞on′, a dangerous hurricane occuring in the China Sea and vicinity. It is a whirling wind of great intensity and area, corresponding to the hurricanes of the West Indies and the cyclones of the Mississippi Valley. These storms occur chiefly from July to October. They often do great damage to shipping even when at anchor.

Typhus Fever, a highly contagious and very frequently fatal fever that may occur epidemically or endemically, and is also called ship fever, jail fever and spotted fever. Congestion and filth—such as are endured by armies in the field and prisoners of war in crowded camps—are highly favorable to the generation and spread of the disease, body and head lice being the common carriers.

The victim is attacked suddenly, the first sysptoms being a rising temperature, rheumatic pains, gastric disorder, headache and muscular rigors. On about the fifth day slightly raised spots appear on the body, increasing in size and growing darker as the ravages of the fever advance. Delirium occurs in the second week, and on the fourteenth or fifteenth day a crisis is reached. Recovery is rapid if the crisis is favorable. Sanitation, isolation, ice packs, baths and antifebrins are the usual curative measures.

The germ of this disease was not isolated until 1915, when refugees from the Balkans reached New York and were found to be infected. During the Austro-Serbian campaign of 1914-15 not less than 135,000 people, including 30,000 Austrian prisoners of war, succumbed to the disease in Serbia. Dr. Harry Plotz of Mount Sinai Hospital, New York, examined the fever victims, isolated the germ, and prepared a serum which, at least as a prophylactic, was used with good effect in Serbia and other

European countries later in the World War. This disease is not to be confused with typhoid fever (which see).

Tyre, tīr, one of the celebrated cities of antiquity. It was the chief port of the Phoenicians, a seafaring people. It was situated at the eastern extreme of the Mediterranean, about equally distant from Damascus and Jerusalem. Hiram, king of Tyre, it may be remembered, was on excellent terms with King Solomon, and in exchange for wheat gave him cedars of Lebanon to be used in building the temple. Modern Tyre is a place of about 6,000 inhabitants. Tyre was overthrown first by Nebuchadnezzar, the Babylonian, by the Persians, and again by Alexander the Great in 332 B. C. Its final subjection was completed by the Roman Antigonus, 313 B. C. Splendid columns, the ruins of an aqueduct, and other public works attest the former beauty and splendor of the city.

In Ezekiel xxvi and xxvii we have a noble description of Tyre, "situate at the entry of the sea, a merchant of the people for many isles."

Tyrol, tĭr′ol, an Alpine region of Central Europe. Geographically, it is the eastern part of Switzerland, but it belongs to Austria. The capital is Innspruck. Its glorious mountain passes, gorges, and valleys almost equal those of Switzerland proper. The Inn, the Adige, and the infant Danube are the chief rivers. Ores of iron, zinc, and copper are mined. Dairy products, wine, and fruit are exported. The inhabitants are partly German, partly Italian. Nearly all are Catholic. See BRENNER PASS.

U

Udall, ū′dal, **Nicholas** (1505-1556), **an** English scholar and dramatist. He was born in Hampshire and received his education at Oxford. He became head master at Eton in 1534. Udall is remembered as the author of the first English comedy, *Ralph Roister Doister.* It was written in rhymed verses, probably about 1540, and was acted by the boys of St. Mary's College, Eton. It was licensed in 1566.

Uganda, a British protectorate of East Africa. The protectorate includes the native kingdom of Uganda and additional territory, in all about 110,300 square miles. Uganda is situated on the head waters of the Nile. It extends from Lake Victoria Nyanza to Albert Nyanza. It lies just north of the equator in a diversified country. The rainfall varies in different localities from 10 to 100 inches a year. There are tropical jungles and desert plains. There are swamps and savannas. Extensive districts along the water courses are covered with luxuriant growths of cane, rushes, reeds, and tropical grasses. There is a bewildering array of plant life, affording corresponding variety of open and cover for different kinds of game. The population of Uganda proper is about 3,100,000. The principal tribe of natives has been converted to Christianity. The men make faithful guides and burden bearers. The soil is fertile. The mountains are rich in mineral wealth. Entebbe is the capital.

Uganda is reached from the east. The tourist, traveling *via* the Suez Canal and the Indian Ocean, enters a harbor full of shipping, and lands at Mombasa, a well built city on the site of an old Portuguese slave station. From Mombasa the Uganda Railway conveys the traveler across plains and through forests past the foot of Mount Kilimanjaro, but ever mounting up to a height of over 8,000 feet; then down again to Port Florence on Victoria Nyanza, 3,650 feet above the level of the sea. From Port Florence steamships worthy of Lake Superior carry passengers to the various islands and landings and new ports of this great inland water. The Uganda Railway was completed in 1902. What with hostile natives and man-eating lions springing into camp at night, the line cost many a life,—one British statesman said a man to the mile. The line is 584 miles long. The local fare is six cents a mile for luxurious first-class passengers. The natives ride for a cent a mile in mere pens.

The traveler is seldom out of sight of game of some sort. Hunting is forbidden in a strip ten miles wide along a portion of the route. The authorities of British East Africa, of which Uganda is a part, exact an annual hunter's license fee, the holder of which is authorized to kill: elephants, 2; buffalo, 1; rhinoceros, 2; hippopotamus, 2; zebra, 2; and from one to ten each of twenty-five different antelopes, bucks, gazelles, hartebeestes, etc., of the antelope kind, also two each of the ant-bear, egret, and marabout. Waterfowls are included without mention. There are wild ostriches, but they are not to be killed at all. Lions and leopards may be killed without license. One island in the Victoria Nyanza is a preserve for elephants. No hunting is allowed. The huge beasts are as tame as barnyard cattle.

See Africa; Livingstone; Speke.

Uhland, oo′länt, **Johann Ludwig** (1787-1862), a noted German writer of lyric poetry. He ranks with Heine. He was born at Tübingen and was educated in the university of that city. He began the practice of law, but abandoned it for literature. *The Good Comrade, The Chapel, The Hostess' Daughter, Siegfried's Sword* and *The Castle by the Sea,* are lyrics best represented by Uhland's fame.

Ukrainia, Republic of, a soviet state of Russia that embraces the most fertile and densely populated section of the former Russian Empire. It has an area of 174,510 square miles and the inhabitants number 26,001,802. The boundaries are, Russia, north and east; the Sea of Azov, Russia, Rumania and the Black Sea, south; and Rumania and Poland, west.

The People. The inhabitants of the

state are the Little Russians mentioned in the article Russia in these volumes. The capital is Kharkov, with a population of 206,000. The largest city, Odessa, has 500,000 inhabitants, and Kiev, Ekaterinodar and Zhitomar have 323,000, 157,000 and 80,787 respectively.

Industry and Commerce. Ukrainia is the great wheat producing state of Russia, as it contains the greater part of the prolific "black belt."' Beets and tobacco are extensively cultivated, and cereals other than wheat, as well as potatoes and fruits, are grown. Horses, cattle, sheep, goats and pigs are raised and exported. Beet sugar is manufactured, and the coal, iron and quicksilver mines are important. The principal Ukrainian seaport is Odessa, on the Black Sea; the harbor has good loading, unloading and storage facilities. The largest grain elevators in the state are located here. The live stock and wheat already mentioned, together with poultry, eggs, hides and pork, are the leading exports.

History. Historians claim that as long ago as the ninth century the first Ukrainian state was founded, and that it continued in existence until, in the fourteenth century, the eastern half was conquered by Lithuania and the western half by Poland. In the fifteenth century Poland succeeded in wresting the eastern half from Lithuania. The Poles continued to rule until 1648, when the Ukrainians gained their independence by force of arms. Later, a part of the state was united with Russia, while Galicia, in 1795, went to Austria.

The language and customs of the Ukrainians were never those of the Great Russians, and the state was never happy under the czars. About 1900 a movement for independence began; differences of language and general culture were emphasized; and in the World War the people saw what seemed a splendid opportunity to win and maintain a distinct national existence. In 1917 the independence of Russian Ukrainia was declared, Austrian Ukrainia winning free a year later. By the Treaty of Riga between Russia and Poland, 1921, both those states formally recognized Ukrainia's independence. But the complete independence of the state is not a fact, for Russia is heavily dependent on Ukrainia for sustenance, and Ukrainia is in economic and military alliance with Russia.

Ulfilas. See Goths.

Ulster. See Irish Free State.

Ulysses, ū-lĭs′ēz, or **Odysseus,** in Greek legend, a king of Ithaca and one of the heroes of the Trojan war. He sailed with twelve ships in the Greek expedition against Troy. Through the ten years' siege, he was celebrated for sagacity, eloquence, and courage. He was prudent also and was chosen frequently to act the part of a spy. After the fall of Troy he attempted to return to Ithaca, but, owing to the enmity of Poseidon, he was doomed to ten years' wandering before he reached home again. The experiences and adventures of these ten years form the subject of the *Odyssey*. He was thrown on the coast of Africa; visited the country of the Cyclops in Sicily, and the Aegean Isle where Circe turned his companions into swine; passed Scylla and Charybdis; and, after a great variety of adventures, at last drew near his own island of Ithaca. Meanwhile his wife Penelope had spent the twenty years of her husband's absence in the care of her son Telemachus and in outwitting the suitors who swarmed the royal palace and insisted on her making a selection among them, assuring her that Ulysses was dead. Penelope had proved faithful, however. Telemachus, on arriving at man's estate, had gone in search of his father; but, guided by Minerva, returned just at the right moment. He found his father, disguised by Minerva as a beggar, with Eumaeus, the swine-herd. Ulysses made himself known to his son, and the two laid a plan whereby they might punish the suitors who had lorded it over the palace and tormented Penelope. A trial of skill was arranged among them, Penelope agreeing to accept that one as her husband who should shoot an arrow through twelve rings hung in line. Ulysses was admitted as a beggar and storyteller, a common union of professions at that time. Telemachus provided a bow formerly used by his father and removed all other weapons. But not one among the company could string the bow. Even Telemachus failed. The old

beggar asked to be allowed to try. All derided him except Telemachus, who urged that he be permitted to try. So Ulysses took the bow. He strung it with ease, and, before anyone could stop him, he had shot an arrow through the twelve rings and aimed another at the throat of one of the suitors. With the aid of Telemachus, Eumaeus, and another faithful follower, the suitors were all slain and Ulysses came to his own again. See PENELOPE; CIRCE; CYCLOPS; ODYSSEY.

Umber, a kind of earth used as a pigment in painting. The name is related to the Latin *umbra,* meaning shade. In its native condition umber has an olive color.

Umbrella-Bird, a remarkable bird of the Amazon valley. It is about as large as a crow. It has a pleasing song. It lives on fruits. It takes its name from a crest of glossy blue feathers rising from the top of the head and spreading in all directions so as to form a feather parasol about four inches in diameter. This bird is known also as a fruit-crow and a dragoon bird.

Uncle Remus. See HARRIS, JOEL CHANDLER.

Uncle Sam, the nickname applied to the people of the United States. It is probably a mere lengthening out of the initials U. S., though the following story is told of its origin: During the War of 1812 some one at Troy, New York, noticed boxes and barrels of supplies marked U. S., and inquired the meaning of the letters. He was told that the goods had been inspected by a local citizen named Samuel Wilson, who bore the nickname "Uncle Sam." The questioner noticed the coincidence of initials, and through him "Uncle Sam" came to be applied to the United States. This origin of the name is not vouched for, however.

Uncle Tom's Cabin. See STOWE, HARRIET BEECHER.

Underground Railroad, prior to the Civil War, a name given to a more or less systematic plan for the escape of slaves. Throughout the territory extending from the Ohio River to Canada there were many slave sympathizers who concealed slaves during the daytime and conveyed them in the night to someone farther on, who, in turn, performed a like service. Instead of forming a line direct from Kentucky to Ontario these self-appointed agents who maintained stations for the underground railway formed a sort of network. It was impossible to foretell in what direction Farmer A would send his passengers. Sometimes, to avoid pursuers who made a business of catching runaway slaves for a reward, he would send a passenger back toward Kentucky, or take him across country and leave him in another line of communication. These agents became very skillful and persistent. Once a runaway slave succeeded in reaching the haymow of an agent of the underground railway he was fairly sure of making his escape. Mrs. Stowe's *Uncle Tom's Cabin* gives an account of one of these conductors. See COFFIN.

Underwood, Oscar W. (1862-), congressman and political leader from Alabama. He was born in Louisville, Kentucky, educated at Rugby School, Louisville, and the University of Virginia, and has served in Congress since 1896. He is a lawyer; also interested in the steel business at Birmingham, Alabama, but not the steel trust. He is a methodical, scientific business man who is said to know more about the tariff than the man who invented it—"the only man in the House who could be placed in an hermetically sealed room and come out with a perfectly good tariff bill." He believes in tariff for revenue only. Personally, he is impressive, ambitious, capable; a rigid parliamentarian, and as effective as senator as he was when Democratic leader of the House.

Undine. See FOUQUÉ, DE LA MOTTE.

Unearned Increment, in economics, the increase in value of land not due to improvements. The application of the term may be understood in connection with a vacant city lot. Improvements on other lots and the general thrift and growth of the city cause this lot to increase in value, even though the owner make no improvements on it. It is held that this increase is due to the effort of the community, and that, so far as the owner is concerned, the increment in value is "unearned." We may illustrate by means of wild farm land. A buys a tract at $10 an acre. He brings the

land under cultivation, erects buildings, plants an orchard, and otherwise improves his property. B purchases a tract similar in quality and similarly situated. He also pays $10 an acre but allows his land to lie unimproved. We may suppose that, owing to the building of roads and railroads, the growth of towns, the improvement of farms in the neighborhood, and increased population, at the end of twenty years B's farm will sell for $30 an acre. Leaving out of account taxes and other costs of holding, the increase of $20 per acre, in the case of B's land, is called an unearned increment because B did not personally earn it. A's land, we will suppose, may be sold for $60 an acre or $30 an acre more than B's land. Inasmuch as this difference is due to A's labor and improvements, it is called an earned increment. The remaining $20 of increase is due to a general rise in the price of land and, as in the case of B, it is an unearned increment. John Stuart Mill and other thinkers have insisted that the unearned increment belongs to the community, not to the individual, and that the government should take the unearned increment for the benefit of all citizens. This course would, of course, put a stop to all speculation in land. If the increase in value is to belong to the government and the people, there is no object in buying land and holding it for a rise in value. In that case buyers would care to obtain only as much land as they need to use, and the rest would be left for those who need it. In 1909 David Lloyd George, British chancellor of the exchequer, presented the annual budget to Parliament. This is a measure which authorizes the expenditure of money for the coming year and determines how it shall be raised. This particular budget proposed that land be revalued each five years, and that the holder be required to pay a special tax equal to one-fifth of the unearned increment. The budget was agreed to by the House of Commons, but the Lords declared the bill confiscatory, revolutionary, and insisted on a new election that the voters might indicate by a choice of a new House of Commons whether they were in favor of exacting a fifth of the unearned increment from British holders of real estate. It is a serious problem in economics.

Unicorn (*unus,* one; *cornu,* horn), a fabulous animal with a single long horn. In heraldry, the unicorn is represented with the body of a horse, the tail of a lion, and a long straight horn growing out of the forehead between the ears. The hoofs are cloven. Aside from its horn, the traditional unicorn resembles the African gnu quite remarkably.

Union Jack, a national ensign of the United Kingdom of Great Britain and Ireland. The national flag of England is the red cross of St. George on a white ground; that of Scotland is the white diagonal cross of St. Andrew on a blue ground; that of Ireland is the red diagonal cross of St. Patrick on a white ground. The three crosses put together form the Union Jack. The triangular portions of the background are blue. The bars representing the crosses are partly red and partly white. Its colors, therefore, are red, white, and blue. Although the American flag was adopted before the Union Jack took its present form, its colors also are derived, as is fitting, from the three flags of the United Kingdom.

Union of South Africa, a British possession of South Africa, comprising the four states of Natal, Cape of Good Hope Province, the Transvaal and the Orange Free State. The combined area of these states is 473,089 square miles and the population is 6,922,924. Of these inhabitants, 5,299,889 are colored—for the most part native black people. The territories of Swaziland, Bechuanaland and Basutoland are protectorates of the Union. The physical features of this region are described under the titles of the four states that form the Union.

AGRICULTURE. Though water is scarce on some of the prairies and high plateaus of the Union, yet the agriculture importance of the territory is great and is annually increasing. In a recent year about 230,000,000 acres of land were in farms. Wherever water is available the soil produces abundantly, and especially in the south the crops native to the temperate zone grow well. The largest single crop is corn, averaging 40,000,000 bushels a year. Oats, wheat, tobacco, potatoes, Kafir corn, barley, cotton, sugar beets, tea and various fruits are also grown in large quantities.

Numerically and commercially sheep are the most important domestic animals, and in a recent year the wool clip weighed, in round numbers, 225,000,000 pounds. The colony has about 6,000,000 head of cattle, 5,000,000 head of goats, and large herds of horses, mules, asses and swine.

Ostrich farming, before the World War, was an important branch of agriculture and the sole support of thousands of people. Production and sale of feathers reached the peak in 1913; during the World War the industry suffered a disastrous reverse, and has not yet (1923) recovered.

Minerals. Though agriculture is important to the Union, mining is the greatest source of wealth. In the production of diamonds and gold the Union leads the world. While these are the leading minerals, there are also valuable deposits of coal, tin, copper, silver, asbestos, salt, antimony, gypsum, lead, zinc, talc and lime, and smaller deposits of a dozen other minerals.

Transportation and Commerce. The Union had nine and a half thousand miles of railroads in 1922; some of the rivers are navigable for small craft; and there are several good harbors. The export trade is large, the principal items being ivory, wild and domestic animal hides, feathers, gold, diamonds and silver, wool, coal and grain. Staple foodstuffs, cloth and such articles as the natives will readily take in trade, are the leading imports.

In 1920 the Union had 2,684 post offices, about 13,000 miles of telegraph lines and 3,250 miles of telephone lines.

After the World War the motor truck, aeroplane and wireless telegraph entered largely into the industrial and commercial life of the province.

Education. Primary education is regulated by the four states of the Union more or less independently of each other. Higher education is the concern of the Union, and since 1918 there are three universities—the University of South Africa, University of Cape Town and University of Stellenbosch. State controlled or aided educational institutions other than those for higher education in a recent year numbered 4,800 for white students and 3,100 for colored students. In 1920 there were also 287 private schools for white students and 76 for colored students.

Government and History. The highest officer is the Governor-General, who holds appointment from the crown. Each province is governed by an administrator appointed for five years by the Governor-General, and by a provincial council elected for three years and presided over by the administrator.

The four provinces of the Union were united in 1910 under the South Africa Act of 1909. The act provided for a large degree of provincial and Union autonomy, and the development of the territory has been peaceful and rapid beyond the most sanguine expectations.

Statistics. The following statistics are the latest to be had from trustworthy sources:

Area, square miles	473,089
Forest area, acres	2,092,000
Population (1921)	6,922,813
White	1,522,924
Colored	5,299,889
Chief Cities:	
Johannesburg	284,191
Cape Town	206,558
Durban	140,324
Pretoria	73,770
Benoni	47,552
Bloemenfontein	38,865
Boksburg	38,115
East London	34,591
Germiston	42,218
Kimberly	39,320
Port Elizabeth	45,927
Krugersdorf	42,525
Pietermaritzburg	35,077
Number of provinces	4
Members of senate	40
Members of house of assembly	134
National revenue	$145,000,000
Bonded indebtedness	$890,000,000
Farm area, acres	229,300,000
Cultivated area, acres	14,000,000
Wheat, bushels	8,113,000
Corn, bushels	43,320,000
Oats, bushels	7,789,000
Barley, bushels	1,137,000
Potatoes, bushels	3,367,000
Tobacco, pounds	11,644,000
Kaffir corn, bushels	2,220,000
Sugar, tons	189,183
Cotton, bales (500 lbs.)	2,000
Tea, pounds	5,168,419
Ostrich feathers, pounds exported	285,178
Wool, pounds	225,000,000
Mohair, pounds exported	6,289,888

Domestic Animals:	
Horses	690,124
Mules	92,795
Asses	525,550
Cattle	5,974,000
Sheep	26,288,960
Goats	4,895,080
Ostriches	283,980
Swine	560,155
Manufacturing establishments	6,890
Capital invested	$205,000,000
Operatives	175,520
Raw material used	$265,000,000
Output of manufactures	$410,000,000
Gold, value	$170,000,000
Diamonds, value	$70,000,000
Coal, value	$20,000,000
Tin, value	$2,175,000
Copper, value	$2,090,000
Silver, value	$1,225,000
Lime, value	$1,220,000
Salt, value	$985,000
Asbestos, tons	7,112
Imports	$505,000,000
Exports	$435,000,000
Miles of railway	9,559
Number of schools	7,749
Pupils enrolled	514,955

Uniontown, Pa., an industrial borough and the county seat of Fayette County, is on the Baltimore & Ohio and Pennsylvania railroads, 70 miles southwest of Pittsburgh. Uniontown is noted for its annual output of coke. The coking industry provides work for 5,000 or more men. Near the city are deposits of glass sand, coal, iron and natural gas. Flour, machinery, glass, iron, steel and foundry products are manufactured.

The city has good schools and a library, and contains the county home for the poor. In 1920, the population was 15,609.

Unitarians, in theology, those who reject the doctrine of the trinity but accept the idea of one God. Using the term in a broad sense, the Hebrews, who never accepted the divinity of Christ, are the leading Unitarian people. The term may be applied also to the Turks and Arabs, who declare that there is but one God and that Mohammed is his prophet. The Arians of the East, including the old Gothic and the Greek churches, were Unitarians to the extent that they declared Christ to be like unto the Father but not equal to Him.

In the modern use of the word, however, the Unitarians are an outgrowth of Congregationalism, both in Great Britain and in this country. Churches, Unitarian at least to the extent that they dissented from the strict Calvinistic doctrine of the day, were founded as early as 1672 at Salem, 1685 at Dedham, 1699 at Boston, and at Philadelphia in 1796. In 1792 Unitarian congregations were formed at Portland and at Saco, Maine. The denomination is accustomed to trace its foundation, however, to the establishment of a Unitarian church by Joseph Priestly in Northampton, Pennsylvania, in 1794 and at Philadelphia in 1796. One of the chief founders of American Unitarianism was William Ellery Channing, who became pastor of the Federal Street Church, Boston, in 1803. Other prominent Unitarian clergymen were Theodore Parker, James Freeman Clark, and Dr. Edward Everett Hale. Jared Sparks was installed pastor of the Unitarian Church in Baltimore in 1819. The American Unitarian Association was formed in 1825. Though founded by Congregationalism, Harvard College early became a center of Unitarian influence. A large number of prominent literary and public men of New England have been Unitarians.

Recent statistics show that this denomination has in the United States and Canada 497 ministers, 456 churches, and 71,110 members. The *Christian Register* is the leading periodical of the Unitarians, others being *The Beacon, The Pacific Unitarian,* and *Unitarian Word and Work.* The work of this church is governed by the American Unitarian Association, with headquarters at Boston, Mass. Churches, as well as missionaries, are maintained in foreign countries. No examination or theological test is required for membership.

United Brethren in Christ, a religious denomination consisting of two branches: the Church of the United Brethren in Christ, and the Church of the United Brethren in Christ (Old Constitution). It was founded in 1768 by Philip W. Otterbein, a missionary of the German Reformed Church. It was reorganized permanently in 1800. The latest available statictics give 355,896 members, 2,403 ministers, 3,498 churches and 3,223 Sunday Schools. The two branches issue 3 publications: *The Religious Telescope, The Watchword* and the *Christian Conservator.*

United Kingdom, a kingdom occupying the British Isles. The kingdom was formerly known as Great Britain and Ireland. The new name was adopted by Parliament upon the union of the British and Irish parliaments in 1801. The United Kingdom is, therefore, a union of kingdoms, as the United States is a union of states. The legislative power is vested in Parliament. The executive authority is vested nominally in the crown, that is to say, the king or queen, but practically it rests in a committee of ministers called a cabinet. The existence of the cabinet depends on having the support of a majority in the House of Commons. The area and population of the United Kingdom are as follows:

Division	Area sq. m.	Population 1921
England	50,874	35,678,530
Wales	7,466	2,206,712
Scotland	30,405	4,882,288
Ireland	32,586	4,390,219
Isle of Man	227	60,238
Channel Islands	75	89,614
National revenue		$5,000,000,000
Bonded indebtedness		$35,000,000,000
Domestic Animals:		
Horses		1,884,902
Cattle		11,770,274
Sheep		23,407,072
Swine		3,113,314
Imports		$5,000,000,000
Exports		$3,500,000,000
Coal mined, tons		229,532,081
Iron ore, tons		12,706,895
Limestone, tons		11,227,817
Clays and shale		11,030,418
Chalk, tons		3,747,165
Oil shale, tons		2,842,582
Blast furnaces		285
Pig iron, tons		2,611,000
Steel ingots and castings, tons		3,625,000
Textile Industry:		
Raw material used:		
Cotton, pounds		1,305,000,000
Wool, pounds		711,000,000
Flax, pounds		63,000,000
Miles of railway		23,734

See IRELAND, SCOTLAND, ENGLAND AND WALES.

United States of America, the central political division of the North American continent, is in every sense the greatest republic in the world. It is bounded by Canada, north; the Atlantic Ocean, east; the Gulf of Mexico and Mexico, south, and the Pacific Ocean, west. For convenience, the area within these boundaries is called continental United States, to distinguish it from the non-contiguous territory that is also included in the general term United States. Continental United States is composed of forty-eight states and the Federal District of Columbia, seat of the national goverment. The area of the continental territory is 3,026,789 square miles.

The non-contiguous territory includes Alaska, Hawaii, the Philippine Islands, Porto Rico, American Samoa, the Virgin Islands of the United States, Guam, Wake Island, the Panama Canal Zone and some scattered islands in the Pacific. These possessions have an area of 716,721 square miles, bringing the total area of the United States to 3,743,510 square miles.

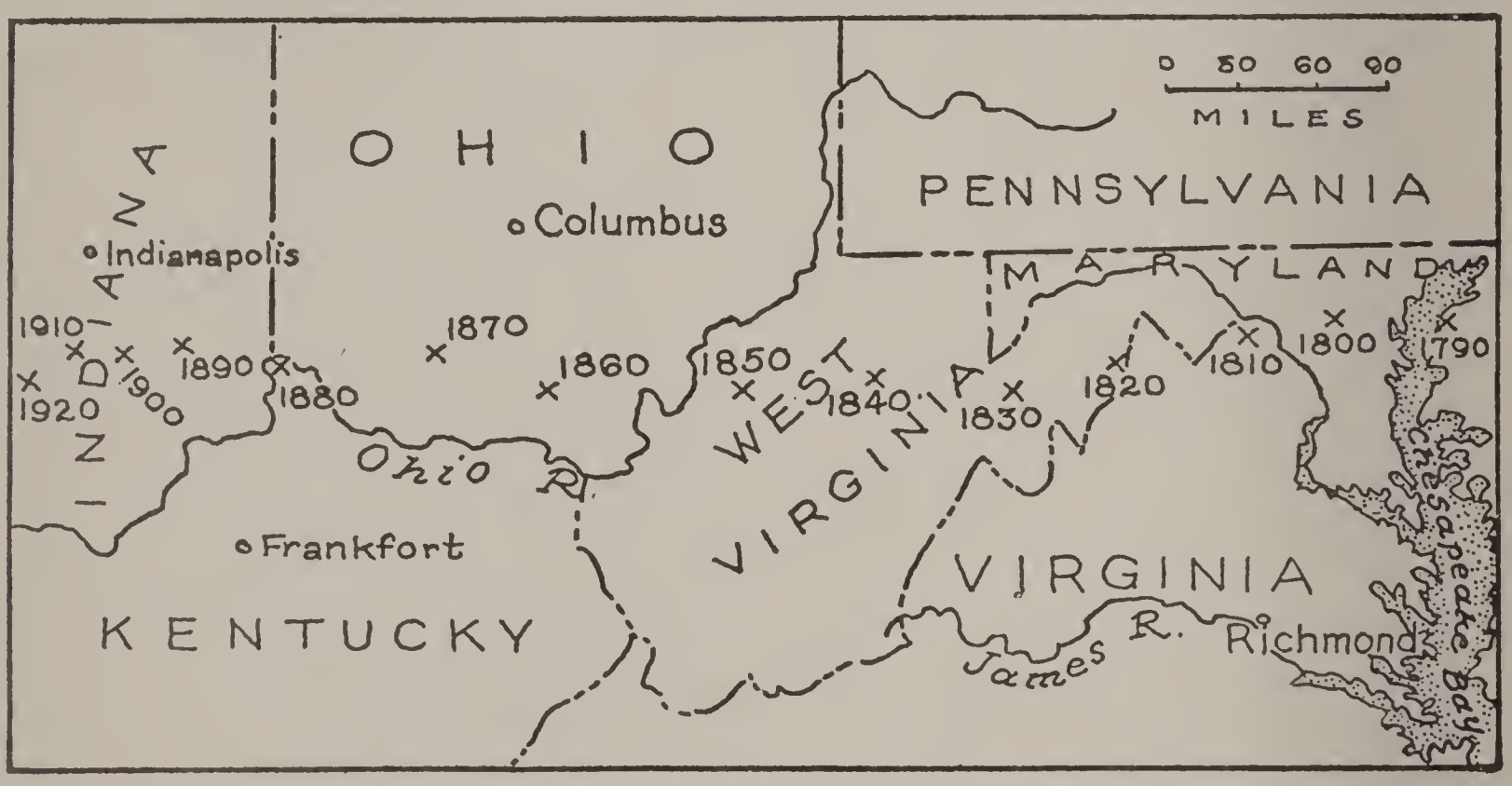
From east to west the maximum distance across the continental area is 3,100 miles, but owing to its irregularity the Canadian boundary is 3,700 miles long. The Mexican border is 2,105 miles in length. The United States has a water boundary 11,075 miles long, and the line that runs from Lake of the Woods (which see) to the Pacific Ocean is the longest uniform mathematical boundary in the world. Never since the determination of the northern boundary has it been fortified, and it has never been violated.

THE PEOPLE. Since the Republic was founded, a census of its population has been taken fourteen times—every ten years, beginning in 1790. By the 1790 census the population was 3,929,214. By 1800 the population had increased 35.1 per cent, or to 5,308,483. In the next ten years it increased from 5,308,483 to 7,239,881, or 36.4 per cent. This was the greatest increase in the history of the country. The 1920 census gave the population of continental United States (to which the preceding figures also apply) as 105,710,620, an increase of 14.9 per cent over 1910. The non-contiguous territory had 12,148,875 inhabitants, making the total for the United States 117,859,495.

In 1920 New York stood in first place as to the number of inhabitants, having held that position continuously from 1820 onward. The state with the smallest population was Wyoming. Rhode Island had

the greatest number of inhabitants to a square mile; Nevada had the smallest number.

The earliest settlers in America came chiefly from the British Isles, France and Spain, but for many decades every country in the world has had representatives in the United States. In 1920 the foreign born white inhabitants numbered 13,712,754. Of these, the largest number came from Germany, the second largest from Poland and the smallest from Luxembourg. (See IMMIGRATION.)



CENTER OF POPULATION
The map shows the movement westward of the center of population during each decade.

The people of the republic are 51.4 per cent urban, 48.6 per cent rural. The second, fifth and eighth largest cities in the world—New York, Chicago, Philadelphia—are in the United States. Nine American cities have populations between 500,000 and 1,000,000; thirteen have between 250,000 and 500,000; while the populations of forty-three others range between 100,000 and 250,000.

SURFACE AND DRAINAGE

Five great geographic divisions mark the United States and also North America as a whole. These five divisions will be taken up in their order from east to west. For minuter descriptions of the surface features of the country the reader is referred to the articles on each of the states. The five divisions are:

The Atlantic coastal plain,
The Appalachian highland,
The central plain,
The Cordilleran highland (Rocky Mountains, Sierra Nevada Mountains, Cascade Mountains, etc.)
The Pacific slope.

THE ATLANTIC COASTAL PLAIN (see COASTAL PLAIN) is narrowest in New England, broadening toward the south and attaining its greatest width along the Gulf of Mexico. In the north the highlands are almost washed by the sea and the rivers traversing the plain are short and swift. The shore lands are sandy, but the soil is of a clayey consistency farther inland. Along the inner edge of the plain is a regular fall line formed by the transition from the old, large rocks of the interior to the soft, new formations of the coast. This fall line makes the rivers excellent sources of power and also forms the head of river navigation.

APPALACHIAN HIGHLAND. Inland from the fall line and extending westward to the interior plain is the Appalachian highland. Just inside the fall line is the piedmont region, a beautiful, hilly strip of country of varying fertility, this depending in part on the nature of the underlying stratum and in part on the pitch of the land.

Inland from the piedmont region is the mountain chain—4,000 to 6,000 feet in

height—that is known by the general name of Appalachian, but is subdivided from north to south into the Green Mountains, Adirondacks, Highlands of the Hudson, Alleghanies, Blue Ridge Mountains, Great Smoky Mountains and Unaka Mountains. This entire system is picturesquely rugged, the steepest ridges occurring toward the southern end. In this part of the range are also a number of commercially important water gaps—passages through the mountains formed by the channeling action of the rivers.

Between this system of highlands and the high, steep eastern edge of the interior plain is the Great Valley—a depression averaging perhaps 50 miles in width and extending from southern Canada to Alabama. In several states or larger regions this valley has different names, but no one part of it is distinctly separate from another. Geologists recognize two causes for this depression—the erosion of a belt of soft rock that occurred here, and the sinking in this region of a part of the earth's shell. The valley floor is in general level, and the soil is so fertile that some of the most productive farms in the country are found here.

Between the Great Valley and the central plain is a region which, though usually considered as several short mountain ranges, is in reality the rugged eastern edge of the great plateau that slopes westward to the Mississppi. In New York, Pennsylvania and a large region south of Mason and Dixon's Line the plateau is known as the Catskill, Alleghany and Cumberland mountains.

The hills of this region are so steep and the soil so barren that it is of no importance agriculturally; but in parts of it—as in Pennsylvania and New York—are carried on some of the country's greatest mining and manufacturing activities.

Central Plain. From the last named region to the Rocky Mountains extends the largest geographic division—the central plain; the Dominion of Canada marks the northern boundary of this plain in the United States, but it extends through Canada to the Arctic Ocean. South, it is bounded by the Gulf of Mexico. The term "plain" is as strictly applicable to this region as it is to any similar region in the world, for the few highlands that occur are not extensive and offer no obstacles to transportation. The ridges along Lake Superior, the Black Hills and the Ozark Mountains are the largest and highest elevations in the plain.

This plain is the great agricultural and stock raising region of the United States, as arbitrarily distinguished from the manufacturing district of the East and the mineral producing country of the West. In general, the top soil is deep, well watered and fertile, and the plain contains the great corn, wheat, hog and cattle raising states of the Union. Southward, toward the Gulf Coast and the mouth of the Mississippi, the land becomes in part low and swampy, but even this region is productive of large crops of rice.

Cordilleran Highland and Pacific Slope. Sometimes one, but more often two, divisions are recognized west of the central plain, the two being the Corodilleran highland and the Pacific slope. The Rocky Mountains (which see) are the greatest of the Cordilleras and east of the coast range are three large and highly productive valleys—the Willamette Valley, the depression enclosing, and running south from, Puget Sound, and the valleys of the Sacramento and San Joaquin rivers. This is one of the most prolific fruit growing regions in the world, and the most productive in North America.

In eastern California is the Sierra Nevada Range, the highest and steepest in the United States. It combines with the Coast Range in the south, and extends northwestward for about 500 miles. This great range averages 85 miles in width and 11,000 feet in height; but in some places it is 100 miles wide, and the greatest peak, Mount Whitney, is 14,502 feet high. The western slope is very steep, that on the east being more gradual. The only rail passages of the range are made at Tehachapi Pass, south, and Truckee Pass, north.

The Coast Range, though it does not equal the Cordilleras in average height, contains a number of lofty isolated peaks. It dominates the valleys on the east and the sea on the west, and is one of the most

attractive scenic regions in the country. It falls so abruptly to the Pacific that, save at the southern extremity of California, there is no coastal plain.

Rivers. The two great drainage areas of the United States are the Atlantic and Pacific areas. It is usual to subdivide the Atlantic drainage area into the Hudson Bay, open sea and Gulf areas. The only really important American stream in the Hudson Bay region is the Red River of the North, though a few rivers to the west of the Red add somewhat to the volume of water draining northward. Save for the Saint Lawrence River (which see), the streams that flow eastward south of the northern border are, comparatively to the Saint Lawrence, small, until the Hudson River is reached. Yet these rivers are for the most part industrially and commercially important out of all proportion to size. Those streams that flow northward into the Great Lakes (which see) are also small but are not as important as those emptying into the Atlantic. A striking feature of the New England rivers is that they are tidal and are in general, short and swift, developing valuable power at the fall line. Such are the Connecticut, Penobscot, Kennebec, Merrimac and Housatonic, to name a few of them.

New York state is drained partly into the Saint Lawrence and for the rest into the Atlantic, the most important river being the Hudson (which see). The Susquehanna and Potomac rivers are the next important rivers toward the south. Below the latter the rivers go in part toward the Ohio River (which see). Important rivers that rise on the eastern slope of the Blue Ridge Mountains and flow down across the piedmont region to the Atlantic are the James, Great Peedee, Roanoke and Cape Fear. East of the Mississippi and flowing into the Gulf are the Appalachicola and Tombigbee rivers. The Mississippi River is described under its title. West of the latter and east of the Rockies the largest streams are the Missouri, Arkansas, Sabine, Brazos, Colorado (of Texas) and Rio Grande rivers.

The two great streams of the Pacific area are the Colorado, flowing southwestward into the Gulf of California, and the Columbia, draining a great area in the northwest. Each of these is described under its title. Between the two, from north to south, is a large number of short but comparatively unimportant streams dropping down from the Coast Range into the Pacific.

The American rivers fill a number of human needs: the Saint Lawrence is a valuable highway; many eastern rivers are power sources; ice is harvested on a number of others; the Mississippi is an important highway (though its importance is not proportionate to its size); the Colorado is one of the greatest scenic routes in the world; the fisheries of the Columbia are very valuable; and many western streams supply water through irrigation ditches to fertile but waterless land.

Climate

Temperature. The climate of the United States is in general the same as that prevailing in the temperate zone in all countries. From south to north the mean annual temperature gradually diminishes; but because the great mountain ranges have a generally north and south direction, they act as barriers to the prevailing winds. This results in sharp changes in temperature from west to east, and in great variations of rainfall. The most variable climate obtains on the Atlantic Coast. In the interior, though sudden variations of temperature are the exception, greater extremes of heat and cold are felt. West of the Rockies the land is open to the warm, Pacific winds, making the climate in general mild and agreeable.

Rainfall. The same variations of rainfall occur from east to west as are noticed in the temperature. Precipitation is heaviest on the Atlantic seaboard and along the Gulf. Farther west the annual amount of rainfall decreases until, as the Rockies are reached, extensive semi-arid or totally arid tracts occur. But on the Pacific Coast again the rainfall is heavy. Here the fall is heaviest in winter, when the land, cooler than the winds coming off the Pacific, brings down rain. The interior plain receives the greatest amount of rain at the time when it is most needed—in the growing season.

The lowest points of Florida and Texas

have an almost tropical climate, while on the northern border the average temperature in the hottest months is about 65°F. On the whole, the United States is subject to greater changes of temperature than is Europe. The mean annual temperature at the northern line is about 40° F., while the minimum is as low as—40°. In the southeast the average for the year is 75°F., though in parts of Texas and Arizona the maximum is as high as 120° F.

Forests

When the white man came to the new continent, almost all of the area now included in the United States east of the Mississippi was forested, the prairie in general extending eastward only as far as that stream. On the mountains west of the prairie country the forests again began, for there the rainfall was sufficient for the nourishment of trees. Conifers grew abundantly in the Great Lakes and Atlantic regions, and on the southern coastal plain, but the uplands between the lakes and the southern plain bore—and yet bear—deciduous hardwoods—oak, walnut, etc. (See Tree).

This region was almost denuded, first, because the settlers needed land for agriculture; secondly, because of the unrestricted prosecution of the lumbering industry, especially around the Great Lakes. (See Michigan).

In the west and northwest, the most recently settled parts of the Republic, the original forests were dense and comprised, first, conifers, and second, deciduous hardwoods. Excepting the forests of North Carolina, Tennessee, Florida, Georgia, Louisiana and Maine, the heaviest timber stands in the United States are west of the Mississippi—California having the greatest forest area, with Oregon second. By the most recent (1923) estimate of the United States Department of Agriculture the total forest area of the United States is 470,703,000 acres.

From the same source we learn that there are more board feet—595,505 million—of Douglas fir than of any other timber, with southern yellow pine—257,691 million—second, and oak—157,372 million—third. (See Forest and Forest Service).

Industries

Fisheries. Since an early date in United States history the American fisheries have been a valuable source of revenue. In the East, the whaling industry, with, in early days, New Bedford, Mass., as its center, was important; but the industry later assumed larger proportions in the Pacific, with San Francisco as the home port of the fleets.

Because the finest food fish are taken in cold waters, the American fishing industry centers largely in New England and in the northwest. Cod, mackerel, haddock and herring are the important New England catches. Farther southward on the Atlantic Coast the cod fisheries and oyster beds occupy many hundreds of people the year round. Off the coast of Florida are shrimp, oyster, turtle and sponge fisheries, the latter being the most important.

Inland, on the Great Lakes and Mississippi River, the sturgeon, catfish, whitefish, trout and salmon fisheries are important. Around such cities as Chicago, Milwaukee and Detroit, hundreds of people are engaged in catching herring and perch for the local market.

Salmon constitute the largest and most valuable catch on the Pacific Coast. The waters off Washington, the Columbia River, and Alaskan waters, are the chief sources of America's supply of salmon. At Seattle and Bellingham, Wash., and Astoria, Ore., are the largest American salmon canneries. (See Salmon).

By the industrial census of 1920 the New England states produced 467,339,870 pounds of fish; the south Atlantic states, 332,614,123 pounds; the Gulf states, 130,-923,583 pounds; the Great Lakes 103,-759,223 pounds; and the Pacific coast states, 286,204,558 pounds. Thus it is seen that the Atlantic fisheries are sources of much more wealth than are any of the other American fisheries. (See Fishery).

Minerals and Mining. Though a few coal, gold and iron mines were opened early in the Republic's history, and though mining activities increased somewhat almost every year, it was not until the fifties of the nineteenth century that mining as an industry was established on a sound basis. Early

in the twentieth century, however, the United States took the world lead in the production of many minerals, and has continued to hold it. While the principal minerals are described under their titles in these volumes, a summary of the American mining industry will be given here.

First in quantity and value is coal; diamonds are rare and platinum is a precious metal, but coal is in high degree useful and is therefore more important to the human family. Many states of the Union yield coal, but Pennsylvania is regularly first. (See COAL, and the table below).

Next in importance—or perhaps more correctly, equally important — is iron. Upon this man is dependent for steel pens, the girders for skyscrapers, the engines of racing automobiles and aeroplanes, and the million other tools and machines whose origins he seldom thinks upon. In American colonial times iron ore was mined in the Appalachian highlands; Pennsylvania and Ohio were rich producers at a later date; but the Lake Superior district—especially Minnesota—and Alabama, are now (1923) the greatest producing fields.

Copper is one of the leading American mine products, and the United States is first in the production of this, as it is first in iron, petroleum and other mineral production. The big producing fields are in Montana, Arizona and Michigan, though it is mined in small quantities elsewhere.

Lead, in the output of which America is first, is mined principally in Missouri, Utah and Idaho, and in some other states is extracted from silver ore.

Virginia, Tennessee, New Jersey, Missouri, Colorado and Kansas produce zinc, Missouri leading.

In early days, gold was mined in small quantities in Virginia and the Carolinas, but until the great California discovery of 1848, the production of gold in the United States was small.

Almost all of the mountain states yield silver, large scale production dating from the discovery of the Comstock Lode, Nevada, in 1859. Montano, Arizona, Idaho and Utah are the other big producers.

Though for a few years in the early history of the petroleum industry the United States was outranked by Russia, the former has for several decades led the world, with every possibility of continuing to do so. New pools are regularly discovered and the industry increases in proportion each year.

Another important item in America's mineral calendar is the product of her quarries—marble, granite, sandstone, limestone, slate, cement rock, glass sand, pottery clay, etc. Maine, Vermont, Ohio, Pennsylvania, Indiana and New York leading in the production of these.

The following table gives a brief summary of the mineral production of the United States for 1921:

Product	Unit of Measure	1921 Quantity
Antimony	Short ton (2,000 lbs.)	1.589
Arsenious oxide	Short ton	4,786
Asbestos	Short ton	831
Asphalt	Short ton	920 632
Barytes (crude)	Short ton	66,369
Bauxite	Long ton (2 240 lbs.)	139 550
Borates	Short ton	50.000
Bromine	Pound	711,953
Calcium-Magnesium chloride	Short ton	23 672
Cement	376-lb. bbl.	95.820 997
Clay, raw	Short ton	1,716,746
Coal, Penn. anthracite	Long ton	80 799 867
Coal, bituminous	Short ton	406 925.000
Coke	Short ton	25,479 000
Copper	Pound	505,586,098
Diatomaceous earth and tripoli	Short ton	67,474
Emery	Short ton	305
Feldspar	Short ton	102.889
Fluorspar	Short ton	34 960
Fuller's earth	Short ton	105,609
Garnet, for abrasives	Short ton	3 048
Gold	Troy ounce	2,422 005
Graphite, amorphous	Short ton	1 842
Graphite, crystalline	Pound	1,189,523
Grindstones and pulpstones	Short ton	26.340
Gypsum	Short ton	3,050.981
Iron, ore	Long ton	26 652 528
Lead (refined)	Short ton	398 222
Lime	Short ton	2,531.000
Magnesite (crude)	Short ton	47 904
Mica, scrap	Short ton	2.577
Mica, sheet	Pound	741.845
Millstones		24,524

Mineral paints and pigments	Short ton	102,463
Mineral waters	Gallons sold	32,000,000
Natural gas	1000 cubic feet	807,670,000
Nickel	Short ton	111
Oilstones, etc.	Short ton	831
Peat	Short ton	30,402
Petroleum	42-gal. bbl.	469,639,000
Phosphate rock	Long ton	2,064,025
Potash (K_2O)	Short ton	4,408
Pumice	Short ton	37,108
Pyrites	Long ton	157,118
Quicksilver	75-lb. flask	35 000
Salt	Short ton	4,981,154
Glass	Short ton	1,256,000
Sand, moulding, building, etc.	Short ton	75,093,000
Silica (quartz)	Short ton	11,252
Silver	Troy ounce	53,052 441
Stone	Short ton	62,400 000
Sulphur	Long ton	954,344
Talc and soapstone	Short ton	126 434
Zinc	Short ton	198,232

AGRICULTURE is the leading American industry, and the total value of the product is greater than that of any other country in the world. The white people who came to America after its discovery were forced to turn to agriculture to avoid starvation, and they found corn—obtained from the Indians—easy to grow and highly nutritious. The colonists could find no European market for corn, however, and therefore grew only such amounts as they could use. But in the South tobacco and cotton throve, and for these products the overseas market was large.

Later, and as the human tide set westward, cereal culture began. The fertile, well watered reaches of the interior plain were dotted with farms, increasing in number each year.

But in the meantime the cultivation of other crops began in the East and South. In the East, buckwheat, rye, wheat, oats and orchard fruits native to the temperate zone were found to thrive; sugar beets, potatoes and timothy and clover hay also took a prominent place on the list of farm products. In the South, after cotton and tobacco cultivation was well established, it was found that sugar cane, peanuts, rice, yams and semi-tropical fruits could be grown. Kentucky and Virginia became the leading tobacco growers; the Carolinas and West Virginia produced a varied crop; yams and cotton took first place in the middle southern states; Florida forged ahead as a grower of semi-tropical fruits; sugar cane, cotton and rice attained dominance in Louisiana and eastern Texas.

But the land farther west, in what is known as the east-north-central group of states, was found more easily adaptable to all temperate zone crops, and this is now only the richest agricultural area in the Union, but also in the world. Illinois and Iowa, for example, show more than 95 per cent of improved land in the total of land in farms. Indiana, Kansas and Ohio are almost as largely improved, and Minnesota, Wisconsin and the Dakotas have immense improved areas. In the greater part of this section corn and wheat take first place, followed by oats, hay, rye, barley, flax, sugar beets, potatoes and orchard fruits, though not necessarily in that order. In Ohio and southern Wisconsin large areas are devoted exclusively to tobacco culture.

The plains of Texas, Oklahoma, Kansas, Nebraska, North and South Dakota, and parts of Colorado, Missouri, Montana, Wyoming, Idaho, Utah and the Pacific states are the great wheat growing sections, the productive area extending well northward into Canada.

Much of the land in the southwestern and western states is useless for agricultural purposes until irrigated, but is found to be highly productive when the requisite amount of water is obtained. The irrigated area increases each year. (See IRRIGATION; DAM; COLORADA RIVER).

The Pacific states are large producers of grain and fruit, Washington leading the Union as an apple grower, California taking first place in the cultivation of semi-tropical fruits.

By the census of 1920 there were 6,448,343 farms in the United States, the greatest number being in the south Atlantic group of states, the smallest number in New England states. The area comprised by these was 955,883,715 acres, of which 503,073,007 acres were improved. The largest area of improved land, comparatively to the total, was in Illinois, though Texas led in absolute improved area, with 31,227,503 acres.

The farm land and buildings were valued

PRODUCTION AREAS OF THE UNITED STATES

DOMINION OF CANADA

PACIFIC OCEAN

ATLANTIC OCEAN

MEXICO

GULF OF MEXICO

LUMBER

GRAIN

FRUIT

WOOL

MINERALS

LIVE STOCK

SPRING WHEAT

CORN AND WINTER WHEAT

COTTON

DAIRYING AND MIXED FARMING

WASH. Lumber, Salmon, Wheat

ORE. Lumber, Wool

CAL. Redwood Lumber, Gold, Quicksilver, Wheat, Petroleum, Oranges and Lemons

IDAHO Wheat, Gold, Silver

NEV. Salt, Gold, Silver

UTAH Silver, Gold, Lead

ARIZ. Fruit, Copper

MONT Copper, Silver, Wheat, Gold, Sheep

WYO. Salt, Sheep, Silver, Copper, Gold

COL. Silver, Lead

N. MEX. Sheep, Copper

N. DAK. Live Stock, Salt, Wool, Dairying

S. DAK. Iron, Live Stock, Dairying, Corn

NEB. Cattle, Dairying, Corn, Oats, Hay

KAN. Stock Feeding, Dairying, Hay, Wheat, Live Stock

OKLA. Corn, Live Stock, Wheat

TEX. Sheep, Wheat, Corn, Cattle, Lumber, Petroleum, Wool, Vegetables

MINN. Iron, Tobacco, Barley, Live Stock, Dairying

IOWA Oats, Lead, Dairying, Potatoes, Hay, Stock Feeding, Dairying

MO. Zinc, Iron, Stock Feeding, Corn, Coal

ARK. Iron, Live Stock, Lumber

LA. Lumber

MISS. Lumber

ALA. Lumber

TENN. Tobacco, Iron, Phosphate

KY. Coal, Tobacco

ILL. Corn, Coal

IND. Coal, Cement, Kaolin

MICH. Fruit, Salt, Potatoes, Celery, Wool, Dairying

WIS. Dairying, Barley

L. SUPERIOR Copper, Iron

L. MICHIGAN Lumber

L. ONTARIO Dairying

L. ERIE Dairying, Broom Corn, Coal

O. Dairying, Coal, Live Stock, Tobacco

W. VA. Coal, Live Stock, Tobacco

PA. Petroleum, Coal, Dairying, Poultry

MD. Coal

VA. Apples, Tobacco

N. C. Tobacco, Wheat

S. C. Kaolin, Truck Farming

GA. Phosphate, Lumber

FLA. Oranges, Phosphate

N. Y. Dairying, Corn

VT. Dairying

N. H. Dairying

MASS. Dairying

ME. Dairying

SCALE OF MILES

0 50 100 200 300

at $66,316,002,602, an increase of $31,514,-876,905 over 1910. In 1919 the total of farm produce was $14,755,364,894, an increase of more than $9,000,000,000 over 1909. Cereals led in value, with hay and forage second and vegetables third. Among the states, Texas led, with Iowa, Illinois and Ohio second, third and fourth respectively.

STOCK RAISING AND DAIRYING. In no other country of the world is the raising of live stock for the market and for dairying such an important agricultural subsidiary as it is in the United States. Since an early day the dairy has played a large part in the economy of the eastern states, and dairying as a distinct industry gradually moved westward until now Wisconsin is the first state in the output of dairy products. (See DAIRYING). Kentucky, Iowa, Illinois and Ohio are noted for pure bred horses, Iowa for pure bred cattle. The great ranges of the southwest and west were for many years the pastures of hundreds of thousands of head of cattle, but in comparatively recent times sheep raising has become important in these sections. Texas, once a great cattle raiser, now has more sheep than any other state, as well as the greatest number of cattle. Iowa is first in the number of horses and swine, Texas in the number of mules.

In 1920 the United States had 120,540 pure bred horses or 0.6 per cent of the total number, with Percherons leading and Belgians, French Draft and Clydesdales holding second, third and fourth places respectively. Illinois had the largest number, with Iowa second.

The pure bred cattle numbered 1,981,514, 3.0 per cent of the total. The leading beef breeds were Shorthorns, Herefords and Aberdeen Angus, in that order; the chief dairy breeds being Holstein-Friesians, Jerseys and Guernseys. Iowa had the largest number among beef breeds, New York among dairy breeds.

Pure bred sheep numbered 463,504—1.3 per cent of the total—and included such breeds as Shropshires, first, Rambouillets, second, and Merinos, third. Oregon had the largest number.

Pure bred swine numbered 2,049,900, or 3.5 per cent of the total number. The Durco Jersey breed was first in point of numbers, with Poland Chinas second and Chester Whites third. Iowa has the largest number, Illinois and Indiana being second and third on the list.

The total value of the domestic animals on American farms in 1920 was $8,013,-324,808, about double the 1910 value. Of the total, cattle represented roughly $3,652,-000,000, horses $1,783,000,000, swine $1,000,000,000. (See CATTLE; HOG; HORSE; MULE; SHEEP.

MANUFACTURE. This term, meaning *to make by hand,* no longer applies to the making of commodities in the United States and the more advanced European countries, and modern economists use the hybrid *machinofacture.* But in this article as in the articles on the states, the old term will be used.

Since the United States grew from east to west, since black slaves were of more use on farms than in factories, and because many of the rivers of New England are excellent sources of water power, American manufacture began in New England, first using water power to drive the machinery.

These New England manufactories at the beginning confined their activities to the production of commodities for local consumption, as flour and grist, leather goods, textiles and clothing. It was in New England that the exclusively industrial settlement originated, and the constant presence there of a large working population has since consistently operated as a localizing factor. Other localizing factors will be considered later.

After water power came steam power, and the general use of the latter introduced another localizing factor—proximity to the fuel supply. As will be learned from the article COAL, Pennsylvania was and is America's largest coal producer, and for many years was an abundant producer of iron. It was inevitable, then, (since nearness to the supply of raw material also largely operates to localize industry) that Pennsylvania should early become, and should remain, the principal American center of the metallurgical industries, especially of that branch that produces heavy steel and iron machinery, boiler plate,

armor plate, structural steel, etc. Almost identical factors operated to give Ohio an industrial complexion similar to Pennsylvania's.

Another instance of confinement to a definite locale is seen in the leather industry. The northeastern states were forested with those hardwoods from which the first vegetable dyestuffs used in the United States were obtained—oak, hemlock, etc.—and it was in the New England states that the leather industry—and the allied shoe and harness industries—first took shape.

A few of the industries considered are not now centered as they were originally: the furniture industry has moved westward from Grand Rapids, Mich., to Chicago, Ill.; the shoe industry has a number of western centers—as St. Louis—; and there is a tendency, in the iron and steel industry, to take the fuel to the ore—as is seen in the establishment of large steel mills at Duluth, Minn., far from an adequate source of coal and coke, but in the heart of the great American iron field. But on the whole, manufacture has been rather sharply limited to those states north of Mason and Dixon's Line and east of the Mississippi River.

Detroit is the center of the automobile industry, because in an early day it was the center of the fine buggy and carriage industry and had large manufactories of the type of gasoline engines used in motor boats and gasoline launches and that are roughly similar to the modern automobile engine. Chicago is the greatest meat packing city for the reason that it is near the source of supply and has excellent distributing facilities. Petroleum was at first extensively refined at Bayonne, N. J., which is comparatively near to the first great source of the crude product—Pennsylvania. As the industry moved westward, Whiting, Ind., became a refining center; and at a still more recent date large refineries were established on the Gulf and Pacific coasts.

As gas, gasoline, hydro-electric and electric power gained favor, the industrial life of America underwent some changes; but these were, generally, on the side of expansion rather than on the side of change of place, and the largest manufacturing industries are centered where they originated. One important exception is the lumbering industry which has tended steadily westward, chiefly because of the exhaustion of the timber supply.

By the fourteenth industrial census, the food and food products industries had the largest number of establishments—61,312—and in point of product value stood first in a list of fourteen comprehensive groups. But the iron and steel group, with 20,120 establishments, issued a product valued at $9,403,634,265 as compared with $12,438,890,851 for food and food products. Thus, though the iron and steel industry group stood seventh in the list of fourteen in the matter of plants, it was second in product value. The largest number of manufactories is in the state of New York, and among cities, New York City has the largest number.

Transportation

The earliest means of conveyance in American history were the canoe and the horse; the earliest transportation routes were the rivers, lakes, game trails and the Indian trails. With the westward movement of population, more open and definite routes were needed, and to meet the need the National Road, connecting the Potomac and Ohio rivers, was opened in 1817, and the Erie Canal, linking the Hudson River with the Great Lakes, was opened eight years later.

Railroads—which are now the great carriers, and of which the United States has more mileage than any other country—developed very rapidly. The Baltimore & Ohio was begun in 1828; this was the first east and west road. In 1830 the country had but 30 miles of railroad, but had 2,818 ten years later and 9,021 in 1850.

The river steamer was developing during this time. The first steamer appeared on the Ohio in 1811, and the lake steamer appeared later. But because of its greater speed and range, the railroad train soon surpassed the canal boat and river and lake steamer as a carrier.

In 1842 the first continuous line of railroad from the Atlantic Ocean to Buffalo, N. Y., was opened. The great thrust westward had begun, and in 1869, when the

first line into San Francisco was opened, the Atlantic and Pacific were linked by rail —the continent was spanned. During this period the territory between the Great Lakes and the Gulf was also crossed by a continuous line.

To the opening of the Civil War, railroad construction continued; the war checked expansion, but between 1865 and 1875 the total mileage increased about twofold. Almost 13,000 miles of lines were opened in 1887, and by 1890 the United States had 163,596 miles of lines—47,210 miles in the East, 27,667 in the South and 88,719 in the West. By 1900 the total mileage had increased to 193,347.

Though the railroads built increasingly across the great West after 1850, the pioneers who opened and built that great region relied largely upon the bull cart—the "prairie schooner"—to convey their families and goods. This movement into the unknown West by slow wagon train, fighting forward against the elements and the hostile red men, is the American epic.

A later development in the history of American transportation is the electric railway. Though of first importance as passenger carriers, they do a considerable amount of short distance freight carrying. The largest electric systems are in the eastern and east-north-central states, New York having the greatest total mileage, with Pennsylvania second and Ohio third.

The latest figures for all American transportation are as follows:

Private or State Canals.....	1,547.17 miles
Government Canals	281.39 miles
Canalized Rivers	4,385.06 miles
Electric Railways	47,555.00 miles
Steam Railroads .....263,707.00 miles	

See RAILROAD; RAILROAD, ELECTRIC; CANAL; INTERSTATE COMMERCE; LOCOMOTIVE.

COMMERCE

Early in American history the principal foreign trade was with England, for the reason that the colonies were British possessions. And because the vast territory now comprised by the Republic lay unexplored, the imports were heavier than the exports. But as agriculture and manufacture advanced in the colonies, the overseas trade assumed greater proportions, and imports and exports became more nearly equal. In 1769 exports were valued at £2,852,441 and imports at £2,623,412. But as regards the trade with the mother country in that year, imports slightly exceeded exports in value.

Consequent upon the War of the Revolution, the British-American trade was discontinued and the trade with other countries was detrimentally affected. This condition was a stimulant to the manufacture of those things formerly obtained from Europe. After the Revolution, Great Britain, Spain, France, Holland, Italy and the West Indies were the principal countries with which the United States traded.

The leading exports at this time were wheat, tobacco, meats, tar, resin, corn, turpentine and lumber, while the principal imports were coffee, clothing, sugar, wine and tea. By 1790 the exports had reached a value exceeding $20,000,000 and the imports were worth roughly $5,000,000 more. Ten years later the imports and exports were worth $91,000,000 and $72,000,000 respectively.

The development of the manufacturing industries of the United States wrought a change in the nation's commercial relations, and in the character of the items of its extensive trade. American manufactures were introduced to Europe in large quantities in the fifties of the nineteenth century, and by the opening of the last quarter of the century American ships were busy on the seven seas.

In 1880, American exports went ahead of imports in total value, the former exceeding the latter by no less than $167.000.000. The difference was larger by $1,000,000 in 1890, and in 1900 American imports were valued at $849,941,000, while exports were valued at $1,394,483,000.

In recent years the United States has imported chiefly such raw materials as rubber, raw silk, Egyptian cotton, various vegetable fibres, etc.; such partially finished products as wood pulp, copper, tin, etc.; and among finished products, rice, cocoa, tea, coffee, sugar, fish (dried, canned and salted), canned fruits, jewelry, etc. The exports consist of almost every article made in the country, together with cereals

and live stock. During the World War almost every allied nation was dependent on the United States for food and for its supplies of metal articles.

For the year 1920-21 America's import trade with the grand divisions of the world was as follows:

Europe	$ 937,950,819
North America (Canada, Mexico)	1,207,459,976
South America	485,249,987
Asia	815,445,819
Africa	54,871,770
Oceania	153,471,059

In the same year the export trade was:

Europe	$3,408,390,118
North America	1,646,016,440
South America	523,450,650
Asia	547,247,117
Africa	134,029,208
Oceania	257,181,813

The largest amount of goods was imported from Canada; the largest exports went to Great Britain. (See MERCHANT MARINE).

EDUCATION

In colonial times educational conditions in America varied markedly from colony to colony, Massachusetts having the best system, Virginia having the worst. In the latter colony no provision whatever was made for free instruction; there were no public schools, only private tutors, and those who could not afford private instruction went unenlightened. In Massachusetts, on the other hand, it was considered the duty of the state to extend educational advantages to all, without favor and for the general good. In the other colonies the systems varied between these two extremes.

But though the idea of free education gradually became popular, it was generally held that free primary education was sufficient, and that he who wished to go beyond the primary schools should pay. Later, the fallacy of such a policy became apparent, and the free secondary (high) school and the state university were established. But in general, these institutions were not established until the Civil War period.

The New England states were pioneers in educational matters for the same reasons that they were pioneers in industry and commerce. The movement for better education spread west and southwest with the movement of the population, but the South was and is backward. The greatest percentage of illiterates (see ILLITERACY) is to be found among the southern states. This is partly due to the large Negro population of the South, and partly due to those causes that have made the South somewhat backward in other respects. But in late years, as will be learned from the article LOUISIANA, to name but one, the southern states have made successful effort to overcome the deficiencies of the educational system.

The reader may learn the educational status of each of the states by consulting the state articles; and the large privately endowed universities are given separate treatment in these volumes, each under its title.

Since 1880, to go no farther back, illiteracy in the United States has steadily decreased, notwithstanding the growth of the Negro population and the heavy influx of immigrants from southern Europe, where educational standards are low. In 1880 the inhabitants of the United States above 10 years of age were 17 per cent illiterate; in 1890, 13.3 per cent; in 1900, 10.7 per cent; in 1910, 7.7 per cent; in 1920, 6.0 per cent. The significance of these figures becomes greater in view of the fact that from 1880 to 1920 the population increased from 50,155,783 to 105,710,620.

In 1920 there were 271,319 elementary and secondary public school buildings in the United States, 618 universities, colleges and professional schools, 92 junior colleges, 449 normal schools, 2,093 private secondary schools, 1,283 private commercial schools, and 1,755 nurses' training schools. Comparison of school figures shows that the number of schools and students is steadily increasing. (See EDUCATION).

GOVERNMENT

The Constitution of the United States, drawn up in 1787, is the basis of the national government (see CONSTITUTION); this instrument became operative in 1788. Federal authority is divided among the three departments provided by the Constitution—legislative, executive and judicial. Nineteen amendments to the Constitution have been made, the last one in 1920, but they made no change in the manner in which authority is delegated.

The legislative branch is the Congress of the United States (see Congress); the proportion of each state's representation in this body will be found in each state article. The President (which see) and his cabinet constitute the executive department. Judicial power is vested in the Supreme Court and the lower Federal courts.

Congress. This body consists of a lower and an upper house, named the House of Representatives and the Senate respectively. Each state has two members, elected by popular vote, in the Senate; while members of the House of Representatives are chosen on the basis of population. After each United States census the House of Representatives decides how many members it shall have during the following ten years. The number decided upon in 1921 was 435, apportioned as indicated in the statistical table appended to each state article. New York has 43 members in the House, while Wyoming, New Mexico, Nevada, Delaware and Arizona have but one each.

Executive. The President is the chief executive and the Vice-President (which see) is the presiding officer of the Senate. Assisting the President are the secretaries of the departments of State, War, Navy, Treasury, Post Office, Interior, Justice, Agriculture, Commerce and Labor. Each of the departments is treated under its title.

Judiciary. The United States Constitution requires the establishment and continuance of the Supreme Court, and gives Congress the right to establish such inferior courts as may be from time to time required. These inferior courts comprise circuit courts of appeals, district courts, court of claims, court of private land claims, admiralty court, territorial court, and a supreme court and court of appeals for the Federal District of Columbia.

History

The northeastern coast of what is now the United States was in all probability visited by Norsemen under Leif Ericson in the year 1000. But the existence of the North American Continent was not known until Columbus made his discovery of 1492. John Cabot made explorations on the coast of Labrador five years later; Ponce de Leon landed on the coast of Florida in 1513, the same year in which Balboa discovered the Pacific Ocean. De Soto discovered the Mississippi in 1541, and at the same time an expedition under Coronado was exploring what is now the southwestern United States.

A settlement was made at Saint Augustine, Florida, in 1565, and Raleigh's colony was established on Roanoke Island twenty years later. Jamestown, Virginia, was founded in 1607; this was the first permanent English settlement in the territory now comprised in the United States. In 1620 the Pilgrim colony landed at Plymouth. At Jamestown the first legislative assembly in America met in 1619, and in that year the colony witnessed the first importation of black slaves.

Now followed two distinct colonizing tendencies. After founding Saint Augustine, the Spanish made no permanent American settlement, but the English began extensive colonization of the north Atlantic seaboard, and the French established themselves on the Great Lakes and the Mississippi River. The most important English colonies were Salem, or the Massachusetts Bay Colony (which see), Plymouth, Rhode Island, Windsor, Hartford and New Haven. The French, at about the same time, made settlements at Kaskaskia, Vincennes and Arkansas Post and the Dutch had established themselves at New Amsterdam in 1613. A Swedish settlement was made at the mouth of the Delaware River in 1638, but this was taken by the Dutch under Stuyvesant in 1655. The British seized New Amsterdam in 1664, and the colony of New Netherlands was thereafter known as New York. The Virginians spread southward, settling the Carolinas and Georgia.

From this time until 1689, both French and English colonies flourished.

In this year the French and Indian Wars (which see) opened, and in 1763 France was forced to surrender almost all of her North American holdings. These wars taught the English colonists that they might one day lose their posessions, and plans for political, military and economic unification were made, culminating in the

TERRITORIAL GROWTH OF THE UNITED STATES 1783 1867

DOMINION OF CANADA

OCEAN

OREGON COUNTRY
BY DISCOVERY, EXPLORATION AND TREATY WITH GT. BRITAIN
1846

LOUISIANA PURCHASE
1803

NORTH WEST TERRITORY
1787

ORIGINAL AREA OF THE UNITED STATES
1783

MEXICAN CESSION
1848

TEXAS CESSION
1850

1853 GADSDEN PURCHASE FROM MEXICO

TEXAS ANNEXATION
1845

SPANISH CESSION
1819

MEXICO

GULF OF MEXICO

ATLANTIC OCEAN

L. SUPERIOR
L. MICHIGAN
L. HURON
L. ERIE
L. ONTARIO
St. Lawrence R.

SCALE OF MILES
0 50 100 200 300

Albany Congress, 1754, and partial union under the plan formulated by Benjamin Franklin.

Another important teaching of the wars was that, in the military sense, the colonies were far less dependent upon the mother country than they were a few years previously, their independence being based upon the removal of the enemy on the west and the ability to act in concert for the general good. Military independence has in all of history been followed by a demand for political independence. In the case of the colonies, this demand was intensified by the imposition of taxes by the home country. The war that culminated in the freeing of the colonies from British rule is fully described in the article REVOLUTIONARY WAR.

Before 1776 several of the colonies had organized state governments and had drawn up constitutions. After the Declaration of Independence, July 4, 1776, the necessity of unification under a single and permanent government was urgently felt. To fill the need, the Articles of Confederation were originated in 1776; but they were not adopted until the following year.

These Articles, though weak enough in themselves, were obnoxious to many of the colonies for the reason that they called for a greater surrender of state rights than the colonies cared to agree to. The question of adoption turned upon the size of the various colonies—as to area and as to population. The small colonies feared absorption into the large ones, and the large colonies did not favor giving up any of their territory. By way of compromise, the large states agreed to cede some of their territory to Congress, the latter declaring that from this it would make new states.

Under the Articles, the new nation went from bad to worse. Congress had no money-raising power; too large a majority of colonial votes was needed to secure the passage of a law; and on many other vital points it had no power. Before the adoption of the Constitution Congress had dwindled to a handful (20) of uninfluential men; the states violated its rulings and flouted its authority, and something very like anarchy had taken the place of constituted authority.

THE CONSTITUTION. Fortunately, there were a few men in the country who sincerely wished for more order in governmental affairs and who at the same time were capable of taking advantage of opportunity. When, therefore, Virginia and Maryland appointed delegates to a conference for the regulation of shipping on the Potomac River and Chesapeake Bay, the delegates asked the legislature of Virginia to call a convention for the regulation of American commerce. In 1786 such a convention was held at Annapolis, with five states represented. Shrewd men in this body, feeling that the time for larger action had come, sent out a call to all the states for a constitutional convention, to be held at Philadelphia in 1787. It was the intention of the promoters of this convention to revise and expand the existing plan of government, but the body had not been long in session before it was learned that an entirely new plan was needed. To formulate this was the convention's task.

More than all others, these two questions called for solution; how was power to be apportioned as between the states and the Federal government? how was the state representation in Congress to be determined? Two antithetical plans were proposed. One, the "Virginia plan," proposed representation on the basis of population; the other—"New Jersey"—plan, proposed arbitrarily determined but equal representation for each state. The result was the familiar compromise plan that has since been in effect—equal representation in the Senate, representation on the basis of population in the House. On the other question a compromise was also effected: to the states was to be—is—reserved all power not vested in the Federal government. For one or another reason many of the states were dissatisfied with the new instrument, and it was not until 1790 that the last state, Rhode Island, ratified it. After the machinery of Presidential elections was devised, Washington was elected to the first office of the nation in 1789, with John Adams as Vice-President. For the leading events of Washington's administration see WASHINGTON, GEORGE. Adams, Jefferson and Madison, in that order, succeeded Washington to the Presidency; for the important events

of their administrations see the articles under the name of each; also WAR OF 1812.

After 1817 two great issues were before the country—slavery and the tariff. Until about 1826, and chiefly for the reason that the Union was engaged in forcing a way westward and in testing its strength, but little animosity marked the discussion of these questions. John Quincy Adams was elected President in 1825. During his incumbency the line between manufacturing and agricultural interests became sharply defined, with the result that the North and the South took different positions regarding commerce and the tariff. About the same time the name of Whigs was adopted by the former National Republicans.

From 1830 onward to the Civil War (which see), the slavery question was an exceedingly potent cause of bad feeling. But for all that, expansion westward continued and the Union became economically stronger each year. The great interior plain was found to be highly productive; manufacturing industries assumed large proportions in the East; gold was discovered in the West. Then came the terrible war of one half the nation against the other half over the question of slavery. (See LINCOLN, ABRAHAM; DOUGLAS, STEPHEN; ARNOLD; CIVIL WAR).

During the reconstruction period the economic condition of the nation for a time went from bad to worse, but as the bitter feeling between North and South was allayed and trade was resumed, the political and economic sky brightened. Expansion in the West continued; more railroads were built; new fleets appeared upon the sea; and new inventions added materially to the nation's wealth and to the individual American citizen's comfort. But in 1893 a wave of industrial depression swept the country; disastrous labor wars were fought, and economic security was not felt again until 1897. The victorious war with Spain was not followed by serious economic disturbances. (See SPANISH-AMERICAN WAR; CUBA; PHILIPPINE ISLANDS; PORTO RICO).

After the opening of the twentieth century material advance was undoubtedly greater than at any other period in the history of the republic, and though the World War (see WAR, THE GREAT) had a profoundly disturbing effect, the nation's position in world affairs was more important in 1923 than it had ever been.

The reader will find interesting supplementary material under the subtitle *History* in each state article, and under the following headings: KENTUCKY AND VIRGINIA RESOLUTIONS; PARIS, TREATIES OF; LOUISIANA PURCHASE; FIFTEEN DECISIVE BATTLES; HAY-PAUNCEFOTE TREATY; LEWIS AND CLARK EXPEDITION; GADSDEN PURCHASE; WILMOT PROVISO; WEBSTER-ASHBURTON TREATY; PANAMA CANAL; WILSON, WOODROW; LEAGUE OF NATIONS.

United States Steel Corporation, the largest industrial corporation in the world, was organized in 1901 by the consolidation of the Carnegie, the Federal Steel, the National Tube, the American Steel and Wire, the National Steel and the American Tin Plate companies. It manufactures one-fourth of the steel and iron products of the world, and can make anything of iron or steel from a tack to a battleship. Many of the employes are stockholders, and the dealings of the corporation with its workmen have been highly commendable.

In 1911 the United States government brought suit in the district court to dissolve the corporation on the ground that it was violating the Sherman anti-trust law. The corporation was sustained, and the case was appealed to the United States Supreme Court, whose decision in 1920 sustained the opinion of the lower court.

Universalists, a Christian denomination distinguished by the doctrine that finally all men will be saved. The rise of the denomination may be traced to the preaching and writing of Rev. John Relly, of London, but its organization is American, the first organization of churches being effected in eastern Massachusetts in 1785. The first general convention was held in Philadelphia in 1790.

The denomination now includes 650 churches with a membership of 60,000 and 778 Sunday schools.

Universe, in astronomy, that part of space that contains the heavenly bodies.

No dimensions can be assigned, for we do not know the distance of the remotest star now visible, nor do we know what stars may exist in space beyond our field of vision. So far as astronomers have been able to study the sidereal or starry universe, they are of the opinion that nearly all the stars are within a space having the shape of a thin disk or the form of a watch. Our sun appears to be near the center of this astronomical universe. The large stars are distributed rather uniformly, but the smaller stars are clustered or arranged in streams. It is held that the entire stellar universe is revolving about a center of gravity situated in or near the largest star in Pleiades.

University, an institution of higher learning. The word is derived from the Latin, meaning a union, and we may add, for the purpose of study and instruction. The name was adopted first by students' associations or guilds. Later it passed to the institution. The oldest university is that of Cairo, Egypt, founded in 988. It is still attended by 9,540 students. The earliest European university was that of Salerno, Italy. It became known as a school of medicine in the ninth century and continued until 1817. It appears to have been managed liberally. Jews, then a hated and despised people, were admitted both as students and as professors. The models of all the older universities in Europe were Bologna, Paris, and Oxford. Bologna made a specialty of law; Paris of theology.

Carrying out the original meaning of the word, the Bologna institution early had at least four universities or students' guilds. The students at Paris were associated likewise and naturally into four universities, unions or nations—the French nation, including Italians and Spaniards, the Picard nation, representing the students from the northeast and the Netherlands, the Norman nation, and the English nation, the latter including students from Ireland and Scotland. All these associations grew up out of the natural desire of students to associate and live with their own countrymen. The students were ordinarily full-grown men, often graybeards. They came great distances, and remained perhaps for years. Instruction was given by lectures in the Latin tongue. The subjects taught usually included grammar, rhetoric, logic, arithmetic, geography, music, astronomy, theology, law, and medicine. Save such instruction as was given here and there by some studious and pious monk, there were no preparatory schools or common schools abroad. This was shown in the founding of the Univeristy of Leipsic in 1409. The Saxon, Pole, and Bavarian elements, becoming dissatisfied with the domination of the Bohemian element in the University of Prague, seceded and marched in a body to Leipsic.

Some of the older universities were Prague, Vienna, Heidelberg, Erfurt, Leipsic, Basle, Tübingen, Mainz, and Cambridge. Following Bologna, Paris, and Oxford as their models, forty new universities were established in the fifteenth century, the century in which America was discovered. They formed a strong factor in the changes that came over Europe. After the fall of Constantinople many learned Greeks, driven from their homes, brought Greek into prominence in the western universities.

University Extension, an educational movement begun in England in 1850, when the University of Oxford established local examinations for those not regularly enrolled as students. The design of this movement was to bring the advantages of higher education within the reach of the people. The work was extended gradually, other universities in England and America adopting the idea. The work as at present carried on includes courses of lectures delivered by university professors or others employed by that educational center which is carrying on the work; outlines of lectures with suggestions and references for outside reading and study, these outlines to be delivered to all attending the lectures; classes for discussion of the subject held before or after the lecture.

Unterwalden. See SWITZERLAND; LUCERNE; TELL.

Upas, the Malay word for poison. The name is given by the natives to a number of vegetable poisons and to a tree beneath whose deadly shade man, bird, and beast were supposed to die. The deadly upas tree is a native of Sunda and the Philippines. It is a tall tree with a bare trunk and spreading top, related to the breadfruit.

Upsala, ŭp-sä′lä, a famous university town of Sweden. The name signifies "the lofty halls." Upsala is situated near the head of a branch of Lake Mälar, about thirty-five miles northwest of Stockholm. The population in 1921 was over 28,897. The city possesses a fine old thirteenth century Gothic cathedral. It contains the tombs of several Swedish kings. The university was founded in 1477. It occupies modern buildings. There are about 2,493 students. The library contains one-third of a million volumes and 12,500 manuscripts. Among others there is a priceless manuscript of Ulfilas' translation of the Gospels into the Gothic language. It is written in silver characters on a purple ground. It is the oldest and the most valuable literary specimen of Gothic extant. Many eminent men, including the immortal Linnaeus, the founder of systematic botany, have been connected with the university. See LINNAEUS; SWEDEN; GOTLAND.

Ural Mountains, a long range forming the boundary between European and Asiatic Russia. It is about 1,600 miles long. The Urals extend in a north and south direction practically from the Arctic Ocean to the Aral Sea. The prevailing height is from 1,000 to 1,500 feet, but there are a few peaks over 5,000 feet high. The eastern slope is much more abrupt than the western. The range is narrow in the north, but spreads out to a width of nearly 200 miles toward the south. The central Urals constitute one of the richest mineral regions known. Coal is abundant. The world's supply of platinum is obtained chiefly here, but the mines show signs of exhaustion. The mines have yielded Russia a large supply of gold for centuries. There are also rich veins of silver, lead, copper, iron, and rock salt. Diamonds and other precious stones abound. The mines are owned by the Russian government.

Urania, in Greek mythology, the muse of astronomy. She is represented in art with a crown of stars and holding in her hand a celestial globe. Sometimes the drapery of the figure is dotted with stars.

Uranium, a metallic element having a specific gravity of 18.6. It was identified in 1789. The name was given in honor of the newly discovered planet Uranus. Uranium is found chiefly in the greenish material known as pitchblende. This ore is found chiefly in Bohemia, but also in Cornwall, Saxony, Hungary, Turkey, Connecticut, and North Carolina. This is the mineral, it may be remembered, from which radium is obtained. Uranium occurs in connection with copper in Saxony and Cornwall. Pure uranium was obtained in 1841. It was not obtained in compact form until 1856. It is a malleable white metal resembling nickel. A compound with sodium, known as uranium yellow, is used in the manufacture of Bohemian glassware. It is used also in painting glass and china.

Uranus, the outermost but one of the major planets. It moves in an elliptical orbit. Its mean distance from the sun is nineteen times as great as that of the earth. The year of Uranus is eighty-four times as long as ours. The light and heat received from the sun is $\frac{1}{370}$ of that received by us. The volume is estimated at from forty-seven to sixty-five times that of the earth; the mass is 14.6 times as great; the density is one-third as great as that of the earth. A body would weigh a trifle more on the surface of Uranus than on the earth. Uranus was the first planet to be "discovered." Others plainly visible were known to the ancients, but it remained for Sir John Herschel, looking through his seven-inch telescope, to discover, 1781, that Uranus was not a star. He thought at first that it was a comet. Uranus has four satellites or moons that have received the fairy names of Ariel, Umbriel, Titania, and Oberon. They have a diameter of perhaps 250 to 500 miles. They, being so small and so distant, were not discovered until 1851. See PLANETS, SATELLITES.

Uranus, ū′ra-nŭs, in Greek mythology, Heaven, the husband of Gaea, and the first ruler of the universe. He was the father of the Titans, of the cyclops, and of the giants. He confined his children in Tartarus, lest they should supersede him, but he was dethroned finally by Cronus. See CRONUS; TITANS.

Urban, the name of eight popes. Of these the most celebrated is Urban II. He was a native of France. He occupied the

papal chair from 1088 to 1099. He preached the First Crusade. He attempted zealously to unite the Greek and Latin churches. He enforced the church laws and forbade priests to marry. He maintained stoutly the policy of his predecessor, Gregory VII, to make the appointment of bishops and election of the pope entirely independent of the Roman emperor.

Urbana, the county seat of Champaign County, Ill., is the seat of the University of Illinois. The city is on the Wabash and Big Four steam roads and on the Kankakee & Urbana and Illinois electric traction lines, 128 miles south by west of Chicago. Besides the university Urbana has a public library, Champaign County Teachers' and Pupils' Library and the Illinois State Laboratory and Natural History Library. Other attractive features are the city and county buildings, high school, Cunningham Deaconess Home and Crystal Lake Park.

The industrial plants of Urbana manufacture bricks and tile, iron ware, lawn mowers and a few other articles. The Big Four has large shops here. The population was 10,244 in 1920.

Uri, o͞o′rĭ. See SWITZERLAND; LUCERNE; TELL.

Ursula, ẽr′sū-lā, an English princess. According to the Christian legend of St. Ursula, she was returning from a pilgrimage to Rome, when, near Cologne, a horde of Huns fell upon her band and put herself and 11,000 attendant virgins to death barbarously. Some accounts reduce the number to as low a figure as eleven. The date is given as 384, also 453. The church of St. Ursula in Cologne was built to commemorate the name. In digging foundations for walls in the early part of the twelfth century the citizens of Cologne came upon an immense collection of bones. Despite the fact that there were skeletons of men and children they were declared to be the bones of St. Ursula and her companions. They were piously cared for and are still preserved in cases placed around the church. They are believed to have miraculous properties of healing. The legend is told also in a series of paintings on the walls of the church. The 21st of October is St. Ursula's day. An attempt is made to identify the St. Ursula of the Catholic church with the goddess Ursel, the Venus of Teutonic mythology. The religious order of Ursuline Sisters, represented in the United States at St. Louis, Alton, and elsewhere, was named for St. Ursula.

Uruguay, Republic of, a state of South America, is bounded on the north by Brazil, on the east by the Atlantic Ocean; on the south by the Plata River; and on the west by Argentina. The area is 72,153 square miles and the inhabitants number 1,494,953. Montevideo, the capital and metropolis, is at the mouth of the Plata; it has a population of 361,950.

PHYSICAL FEATURES. The highest points of land in the state are in the north and east; the central interior is chiefly prairie; while on the coast the land is low and sandy. The temperature varies between 35° and 86° for the year, and the climate is healthful. The Rio Negro is the principal stream lying wholly within the state, but the Plata and Uruguay, border rivers, are important in the national economy.

INDUSTRY AND COMMERCE. Stock raising is the leading industry, but lately more land is devoted to agriculture each year. Sheep are numerically first among the domestic animals, and are followed by cattle and horses. The leading crops are wheat, oats, flax seed, barley and grapes. Wine and raisins are valuable agricultural bi-products. Manufacture has not (1923) advanced far.

A considerable export trade is carried on, wool, hides, live stock, wheat and wine being the leading trade items. The Rio Negro is navigable for small craft over a part of its course, and the state has upward of 1,600 miles of railroads.

EDUCATION. Primary education is free and compulsory and this enterprising republic is doing all possible to insure the intellectual advancement of its people. In 1920 the primary schools numbered 1,005, and more than 102,000 pupils were enrolled. In the same year there were 21,000 pupils attending private schools, 6,060 attending secondary schools, and 6,000 adults attending night schools. There are secondary schools other than those publicly maintained, and the state maintains normal schools for males and females, as well as a school of arts and trades. In 1920 the

University of Montevideo had 344 instructors and 4,165 students.

Government and History. The state is governed under the constitution as amended in 1918. All males over 18 are allowed to vote. The chief executive is elected for four years by direct vote. The legislature is divided into two houses of 19 and 90 members respectively.

The Spanish visited Uruguay in 1512 and took possession of Montevideo in 1526. The state was made a separate dependency of Spain in 1750. The Uruguayans won their independence in 1826. For some decades it was torn by internal strife, but after 1870 its peaceful existence was assured. Uruguay broke with Germany in 1917, but did not actively participate in the World War.

Statistics. The following statistics are the latest to be had from trustworthy sources:

Area, square miles	72,153
Population (1920)	1,494,953
Chief Cities:	
Montevideo	361,950
Salto	30,000
Paysandu	26,000
Mercedes	23,000
Number of departments	19
Members of senate	19
Members of house of representatives	90
National revenue	$36,553,495
Bonded indebtedness	$172,202,766
Farm area, acres	2,000,000
Wheat, bushels	7,768,000
Barley, bushels	169,000
Oats, bushels	1,986,000
Flax seed, bushels	932,000
Grapes, pounds	112,964,000
Wine, gallons	7,919,000
Domestic Animals:	
Horses	567,154
Mules	16,663
Cattle	7,802,442
Sheep	11,472,852
Goats	12,218
Swine	303,958
Imports	$20,000,000
Exports	$40,000,000
Miles of railway	1,625
Number of public schools	1,055
Pupils enrolled	102,889

Utah, "The Salt Lake State," one of the mountain states, was named for the Ute Indians. It has an area of 84,990 square miles, and is tenth in point of size. On the north Utah is bounded by Idaho and Wyoming; on the east by Colorado; on the south by Arizona; and on the west by Nevada.

The People. The population of Utah was 449,396 in 1920, or 5.5 to a square mile. In this respect it ranked fortieth. The foreign-born residents numbered 56,455, and only 2,711 Indians remained in that year. Considering the comparatively small population, the percentage of urban dwellers, 48.0 per cent, is large. Salt Lake City had a population of 118,110 at the last census; Ogden had 32,804 inhabitants; and Provo had 10,303. Only two other cities had more than 5,000 inhabitants.

Surface and Drainage. The surface of the state is a high plateau that is cut in two down the center by the Wasatch Mountains. This range enters from Idaho in the center of the state line and extends southward for almost exactly half the length of the state, terminating in Mount Nebo. A high plateau continues into Arizona. The eastern side of the range has the loftiest peaks, some of them rising to about 13,000 feet; and farther eastward, separated from the main range, are many more or less isolated ranges. The northeastern corner of the state is crossed by the Uinta Mountains, which are unusually steep and jagged. Many peaks in this range are more than 13,000 feet high, and the highest, Gilbert Peak, attains 13,687 feet. In the south and southeast are the Abajo, La Sal and Henry mountains. The Wasatch and Uinta ranges are noted for the wild grandeur of their scenery, and in the Bad Lands, near the Colorado River and the Henry Mountains in the south, are the greatest natural bridges in the world (see Natural Bridge).

West of the Wasatch Mountains and not far south of the Idaho line is the Great Salt Lake, (which see), and west of this body of water are 4,000 square miles of sterile desert land known as the Great American Desert.

In the eastern part of the state, and about a third of the distance north, the Grand and Green rivers unite to form Utah's principal stream, the Colorado. The Grand River enters Utah from Colorado and the headwaters of the Green are in

Wyoming; but the Green and Colorado are fed by numerous swift streams that rise in the Uinta and Wasatch mountains. The White, Uinta, Duchesne, Price and San Rafael are the chief Green River affluents; while the Fremont and Escalante rivers enter the Colorado from the west and the San Juan from the east. The Bear River enters from Idaho and empties into Great Salt Lake, and the Weber, Malad and Jordan rivers also flow into the lake. The extreme southwestern corner of the state is drained by the Virgin River.

CLIMATE. Utah has an exceedingly dry climate, owing to its position between the Sierra Nevada and Rocky Mountain ranges, which exclude the water laden clouds. The mean annual temperature is 48° F, but extremes of heat and cold are suffered in the south and north respectively. The annual average rainfall is only 12.5 inches, and extensive irrigation is necessary for agriculture.

MINERALS. Utah is an important mining state. Mining was retarded for many years by Brigham Young, the Mormon leader, who wisely demanded of his followers that they turn to agriculture in order to produce the necessities of life. Young died in 1877, and thereafter mining became the first industry. Bituminous coal of the first quality is available in large quantities on the eastern slopes of the Wasatch Mountains and in the southwestern part of the state. The annual output is about 5,000,000.

Copper and lead are found in all but the southeastern section of the state, as are gold and silver. Iron is mixed in the southwest and quicksilver is found in the central west. Sea salt is obtained from Great Salt Lake; and in various parts of the state are deposits of zinc, borax, sulphur, bismuth, slate, limestone, sandstone, granite, pumice, marble, gypsum, asphalt, brick and fire clay and rock salt. In 1920 Utah's mineral output was valued at $45,169,328.

AGRICULTURE. Many millions of acres of Utah land are fertile, but the great need is water. By the last agricultural census there were 1,715,380 acres of improved land in the state, and of this the amount under irrigation was 1,371,651 acres. Other irrigation projects are in prospect (1923), and as soon as they are carried through another million acres of arable land will have water.

Agriculture is now the leading industry. The principal crops are wheat, sugar beets, potatoes, oats, hay and corn, though barley, rye and apples are becoming important crops. The total value of the farm products of the state were returned as more than $58,000,000 at the last census. Sheep are the most numerous domestic animals, and cattle are second.

MANUFACTURE. Utah had 1,160 manufacturing establishments capitalized at $140,785,034 when the last industrial census was taken. Large deposits of coal and ample water power have greatly aided the state's industrial development. Copper and lead smelting is the leading industry, and is followed by beet sugar making. These two industries use the greater number of the factories in the state. At Provo is a large woolen mill that was established by Brigham Young in 1872. The principal centers of manufacture are Ogden and Salt Lake City.

TRANSPORTATION. Utah has 2,144 miles of railroads, but there are no navigable rivers. The principal roads are the Oregon Short Line, Denver & Rio Grande, Central Pacific, Union Pacific, San Pedro, Los Angeles & Salt Lake and the Western Pacific. The state has many hundreds of miles of improved highways.

INSTITUTIONS. State charitable and correctional institutions include the prison, State Mental Hospital, State School for the Deaf and Blind and State Industrial School. There are also a number of private institutions.

EDUCATION. Primary education is free and is, with certain qualifications, compulsory for all between the ages of eight and fifteen. In 1920 there were 637 public elementary and 46 public high schools and a normal school. The Latter-Day Saints (Mormons) maintain a teachers' summer school, and Brigham Young College, Brigham Young University and Latter-Day Saints University. The highest state institution is the University of Utah, supplemented by an agricultural college.

The state university was organized in 1850 under the title of University of the State of Deseret. It led a precarious existence for some years and in 1884 the power to confer degrees was granted. In 1892 the present name was adopted and in 1894 the institution received a grant of 60 acres of land. The university is organized into colleges of arts and sciences, mines, law, medicine and education, and conducts a summer session. In 1922 the faculty numbered 153 and the student body 5,762.

GOVERNMENT. Utah is governed under the constitution adopted in 1895, which provides for a legislature divided into two houses. The senate consists of not more than 30 members; the house of representatives must have not less than twice and not more than three times the number of members in the senate.

Executive officers are the governor, secretary of state, attorney-general, treasurer, auditor and superintendent of public instruction. Each of these officers is elected for four years.

The judiciary consists of a supreme court and such inferior courts as may be from time to time established by law. Justices of the supreme court, five in number, are elected for ten years.

HISTORY. Though Utah was visited by the Spaniard Cardenas as early as 1540, and by other explorers and by trappers at later dates, the credit for settling and organizing the territory goes to the Mormons under Brigham Young (see MORMONS; YOUNG, BRIGHAM) who sought refuge here in 1847. The United States acquired the territory from Mexico by the Treaty of Guadalupe Hidalgo in 1848. The Mormons thereupon set up a government and sought admission to the Union as the State of Deseret. Their request was refused by Congress, and the Territory of Utah was organized in 1850, with Brigham Young as the first governor.

In 1862 Congress passed a law prohibiting polygamy, but the practice continued until 1887. In that year Congress passed a more rigid law, under which polygamists were disfranchised and the property of the Church of the Latter-Day Saints was confiscated. In 1890 the Mormon president ordered the discontinuance of polygamy. Later, a constitution was drawn up, and the state was admitted to the Union in 1896. Railroads had been built into and across the state, and its industrial and educational progress was rapid.

STATISTICS. The following are the latest statistics to be had from trustworthy sources:

Land area, square miles	82,184
Water area, square miles	2 806
Forest area, acres	3,600,000
Irrigated area, acres	1,371,651
Population (1920)	449,396
White	441,901
Negro	1,446
Asiatic	3,338
Indian	2,711
Chief Cities:	
Salt Lake City	118,110
Ogden	32,804
Provo	10,303
Number of counties	28
Members of state senate	20
Members of house of representatives	55
Salary of governor	$5,000
Representatives in Congress	4
Assessed valuation of property	$675 000,000
Bonded indebtedness	$3 435 000
Farm area, acres	5,050.410
Improved land, acres	1,715.380
Wheat, bushels	6,299 000
Oats, bushels	2 876 000
Potatoes, bushels	2,415 000
Corn, bushels	517 000
Hay, tons	1,342,000
Sugar beets, tons	1 060 000
Wool, pounds	16,150,000
Domestic Animals:	
Horses	140,000
Mules	8,000
Milk cows	108 000
Other cattle	473 000
Sheep	2,245 000
Swine	103 000
Manufacturing establishments	1,160
Capital invested	$140,785 034
Operatives	18 868
Raw material used	$110 154 349
Output of manufactures	$156 933 071
Gold, value	$1,794 000
Silver, ounces	12 366 000
Copper, pounds	34 534 000
Lead, pounds	89,782,000
Zinc, pounds	8 157,739
Coal, tons	5,800 000
Miles of railway	2.141
Teachers in public schools	3 822
Pupils enrolled	97,405

Utica, the county seat of Oneida County, New York. It is situated on the Mohawk River and on the Erie Canal, in an agricultural and dairy region. The manu-

factures are men's clothing, hosiery, print goods, cotton and woolen goods, canned goods, heating apparatus, agricultural implements, gas fixtures, and trunks. It is an important cheese market, and its farm products, dairy products, flowers—especially roses—are in great demand in the larger cities. There are over fifty churches. A large number of charitable institutions have been established for the relief of the needy. The principal buildings are the government building, the state armory, court house, the public library, and Y. M. C. A. and Y. W. C. A. buildings. Originally Utica was the Old Fort Schuyler settlement which was incorporated as a village in 1798 and chartered as a city in 1832. Utica is popularly called the "City of Charities" and "The Gateway to the Adirondacks and the Thousand Islands." In 1920 the population was 94,156.

Utilitarianism. See PHILOSOPHY.

Utopia, a political romance, written by Sir Thomas More. It was printed in the Latin tongue and appeared in 1516. It was translated in 1551 and again, this time by Bishop Burnet, in 1683. Utopia is considered the source of modern socialistic writings. The author did not consider it wise to father his own ideas. The romance appeared as an account by Raphael Hythloday of a country called Utopia, which he had visited while on a journey with Vespucius to the New World. Utopia is Greek for "no place." The conditions described as prevailing in Utopia were regarded by Englishmen as possibly ideal but not practical. For this reason suggestions for reforms that are unlikely to be made are called Utopian. As a matter of fact many of the notions suggested in More's *Utopia* were eminently practical and are now recognized as such.

See MORE, SIR THOMAS.

Utrecht, ū′trĕkt, an ancient city of the Netherlands. It is situated on the Old Rhine, about twenty miles southeast of Amsterdam. Like many other Dutch cities, the streets are largely canals. They are crossed by numerous bridges. The old fortifications of the city have been torn down to make way for attractive boulevards. The most interesting building is a Gothic cathedral of the thirteenth century. The University of Utrecht has recently moved into modern buildings. Students have access to a botanical garden and a library of 200,000 volumes. Iron foundries, cigar factories, breweries, sawmills, paint mills, and organ factories are among the prominent industries. In 1920 the population was 140,189.

V

Vacation Schools. See SCHOOLS.

Vaccination, văk-sĭ-nā′shŭn, the act of giving a person an infectious disease known as cowpox. Another name for the disease is vaccinia, from the Latin *vacca,* a cow. The operation is performed usually by scraping away the outer skin of the arm or thigh and applying a small amount of virus or lymph taken directly from a diseased cow or from the scab of a person who has been freshly vaccinated. Vaccinia or cowpox is, it is thought, a mild or degenerate form of the dread disease, smallpox. When a person's arm has been vaccinated the spot turns red in a day or two. On the third or fourth day a sort of blister appears, followed at the end of the eighth day by a ring of inflammation. In about twelve days from the beginning the inflammation begins to subside and the blister turns yellow and then dries up and forms a crust or scab which usually falls off at the end of twenty days, leaving a permanent scar. During this interval the patient has mild symptoms of smallpox. The purpose of vaccination is to accustom the system to an attack of this sort, and render it proof against smallpox. In some way not understood by science the lymph of the body fortifies itself during this mild sickness in such a way that the germs of smallpox cannot live in the body should they unfortunately be taken into the blood at a later date.

The history of vaccination is full of interest. Cowpox attacks many animals of the ox kind, but particularly a milking cow. The blisters, like those of vaccination, form around the teats. Towards the end of the eighteenth century the notion got abroad in the dairy district of western England that milkmaids and others who had caught the cowpox in their hands or arms by milking cows were exempt from the smallpox from which their relatives died. This theory attracted the attention of Edward Jenner, a young medical student, who saw in it a promising means of averting the dreadful scourge of smallpox. In 1778 he laid his observations before the medical profession. Disregarding the universal ridicule with which his views were met. he published in 1796 a now celebrated treatise on the causes and effects of cowpox. His views could no longer be ignored. They have been the subject of bitter controversy from that time until the present day. Not to go into detail, the whole theory of vaccination lies in the simple principle that one who has had cowpox is not likely to take the smallpox.

Many mistakes have been made in vaccinating. Persons have been vaccinated who were not in physical condition to withstand even the mild cowpox. Blundering in the use of virus has resulted in the communication of smallpox itself and in the death of many patients; but in general it may be said that a contest running through a hundred years has been decided in favor of vaccination. The chances of death from vaccination itself have been reduced to a minimum. The official records of Germany covering 32,000,000 cases, show that deaths from cowpox amount to but two per million vaccinations. The low death rate from smallpox in countries that have enforced vaccination affords a strong proof of its value. Stated in the number of deaths per year for every million people, in London, where records reach back to 1629, the annual death rate from smallpox has fallen from over 4,000 people per million to less than twenty. In Prussia the rate of deaths was quite as high, but, under strict enforcement of vaccination laws, the death rate has fallen to two per million. At the beginning of the nineteenth century the annual death rate in Sweden from smallpox was over 2,000 per million people. In 1816 vaccination was made compulsory; the death rate fell to 133 inside of ten years, and the century closed with an annual death rate from smallpox not exceeding one person per million inhabitants. Austria, Italy, India, Australia, Japan, in short, all progressive countries, add their testimony in favor of vaccination as a preventive of smallpox.

While there is no general law in the United States, immigrants are vaccinated

before they are allowed to land. Army surgeons enforce vaccination among the soldiers, and most if not all states permit local boards of education to require vaccination as a condition of attending school. There are in the United States a number of institutions that make a regular business of supplying the cowpox virus or vaccine. It is cultivated usually on the body of heifer calves, and is shipped to physicians in glass tubes. There is still, it must be confessed, some opposition even from physicians to the practice of vaccination, but in the face of what it has done for the world the merits of Jenner's great discovery cannot be denied successfully.

See JENNER; SMALLPOX; PASTEUR; HYDROPHOBIA.

Vacuum. See AIR-PUMP.

Vacuum Cleaner, a contrivance for removing dust from rugs, curtains, upholstered furniture, etc., by means of suction. It consists, primarily, of a pump drawing air through a nozzle which is passed over the surface that is being cleaned. The dust, carried off by the air stream, is filtered through the cloth screens or baffle-plates and then allowed to settle in a receptacle for that purpose. At first the plants consisted of a pump driven by an electric motor and were periodically taken around to houses, offices, etc. Later, central plants with a system of pipes running to all the floors were installed in big buildings. At various points the pipes were connected by means of flexible tubes with the cleaning tools. In some instances the vacuum thus created is utilized for washing floors by means of connection with a system of tanks supplying soap and water, which spread over the floor, is again removed and passed into the sewers. In their final development vacuum cleaners have become ordinary household utilities and small machines are now made in a variety of forms, driven by hand, by foot, or by an electric motor attached to the lighting circuit.

Valencia, a city of Spain. It is situated on the eastern coast near the mouth of a small river. In size Valencia is the third city of Spain. There are manufactures of soap, chocolate, paper, tobacco, and silk, and a large export trade in oranges, wine, rice, and olive oil. The town was founded by the Romans 138 B. C. It has been occupied by the Romans, the Goths, the Moors, and the French. The principal buildings are from 200 to 700 years old. The citizens have pride in a university, a large library, a picture gallery, an extensive botanical garden, a bull ring, a theater, and other public institutions.

Valentine, a missive sent by one person to another of the opposite sex on February fourteenth, Saint Valentine's Day. It is not customary to sign a valentine. A great diversity of taste prevails. Some valentines are beautifully embellished and bear choice sentiments, poetical quotations, and the like. Others are coarse prints, mere caricatures, unworthy of the sender. Saint Valentine was a bishop of the early church. He was put to death at Rome in the reign of Claudius, February 14, 270. He was canonized as a martyr by the Roman Church. The day of his death was set apart in his honor.

During the old time Feast of the Lupercalia, celebrated in honor of Juno, it was customary for Roman youths to draw tablets from an urn. On each table was inscribed the name of a maiden to whom he was supposed to devote himself for a year. This festival was held near the anniversary of the martyr's death, and was finally merged with it to the extent that the practice of choosing sweethearts for the ensuing twelve months became a common one on St. Valentine's Day.

As a matter of fact there were several saints by the name of Valentine. One German authority enumerates fifty-two. A pretty story connected with one of them runs to the effect that he was a charitable man visiting the sick and the needy. When bedridden with old age he continued to send kindly messages to those he could no longer go to see. The German peasants were wont to call on their St. Valentine for relief in case of epilepsy.

An opinion was prevalent, among the English peasantry at least, that birds chose their mates at this season. Both Shakespeare and Chaucer speak of St. Valentine's Day as a time when every bird chooses his mate.

Valhalla. See ODIN.

Valkyrior. See ODIN.

Valladolid, a city of Spain, the capital of the province of the same name. It is situated in a spacious, fertile plain on a tributary of the Douro 110 miles by rail from Madrid. Valladolid was the capital of Spain before the monarch moved his residence to Madrid. The royal palace still stands. The University of Valladolid, founded in 1346, is attended by over 1,000 students. Among buildings of note is an unfinished cathedral. Ferdinand and Isabella were married here. Columbus died at Valladolid. The house in which he passed away is still shown. Cervantes resided in this city. There are manufactures of iron, cloth, silks, paper, leather, chemicals, and gold and silver wares. The present population is 69,799.

Valley Forge, a village in Chester County, Pennsylvania, about twenty-four miles west of Philadelphia. It is noted as the place where Washington and his small army established their winter quarters after they had been driven out of Philadelphia by the British in 1777. The soldiers suffered severely for want of food and clothing. The soldiers built their own huts, but suffered greatly from cold and hunger. Men bound up their feet with rags and stood on guard, shivering all night without overcoats, and then went into camp to find no breakfast. The frozen paths traversed by the patrols were said to be marked with blood. Washington appealed in vain to Congress for supplies and clothing; but the commissary department was so incompetent that the necessary articles lay piled up in store all winter while the soldiers went without. In 1893 the legislature of Pennsylvania made an appropriation to make Valley Forge a public park. A monument has been erected to the memory of the soldiers who perished in camp. The old trenches thrown up by Washington's soldiers may still be traced. The stone house in which Washington established his headquarters stands yet in a fair state of preservation. The park has been enlarged to include 1,010 acres.

Vallejo, Cal., an industrial city, is on San Pablo Bay and on the Southern Pacific Railroad 30 miles north by east of San Francisco. It also has auto bus transportation to nearby bay cities and to Sacramento. The most important industrial establishment is the Mare Island Navy Yard, opposite the city. A causeway connects this island with the main land. There are manufactories of flour, cement, lumber products, canned fruit and fish, and leather. Near the city is one of the richest American quicksilver mines.

The city hall, post office, Home for Orphans and St. Vincent's Academy, high school, grammar school and primary schools, three new Protestant churches, a Y. M. C. A. and Y. W. C. A. are among the important buildings. Vallejo has modern apartment houses and new office buildings.

Vallejo was founded in 1850 and was intended for the state capital; for three years subsequently to its settlement the legislative sessions were held here. It was chartered in 1866, and in 1920 had 21,107 inhabitants.

Valois, väl-wä′, a ruling family of France from 1328 to 1589. The name of the family was derived from an ancient territory of France lying to the northeast of Paris. The chief member of the family was Francis I. The house of Valois was succeeded by that of Bourbon. See BOURBON.

Valparaiso, väl-pä-rī′sō, the chief seaport of Chile. It is situated opposite Santiago, the capital. Charleston, South Carolina, and Valparaiso are about equally distant from the equator. The city has a fine harbor and is advantageously situated to command a large amount of the Pacific coast trade. There are large floating docks. The city is substantially built, with railroads, telegraphs, and telephone lines, and a sewage system. A bountiful supply of water is obtained from an artificial reservoir in the mountains capable of holding, it is said, 25,000,000,000 gallons. The population in 1920 was 182,242. See CHILE.

Valparaiso University, a large private university at Valparaiso, Indiana. It was founded in 1873 by H. B. Brown, a young teacher. It had then but three departments, four instructors, and thirty-five students. There are now 3,250 students and 115 instructors; the campus of fifty acres has nine substantial buildings. Valparaiso is not far from Chicago where

the excellent dental and medical colleges of the university are located. Besides a general education, either college or preparatory, young men and women may obtain at Valparaiso special training in law, music, medicine and surgery, dentistry, physics, the natural sciences, civil engineering, banking, insurance, commerce, railroading, pedagogy, in short an almost absolute choice of studies is given the student, it being assumed that he wishes to take the subjects which will further his chosen work.

Value, the term used by political economists to designate the desirability of any object that will satisfy a human want. This is the fundamental meaning of the term, though in the world of every day it means the power of commodities in exchange on the market.

Karl Marx said that "the value of a commodity is determined by the amount of social labor power necessary to produce it;" but it is obvious that even though it requires hundreds of hours of social labor to produce a commodity, the commodity will have no value if no one wants it.

Under abnormal conditions, the value of an article may be very high, as when, though the world does not lack water, one is dying of thirst. But the economics of every day are not based upon nor conditioned by such abnormal cases. The conditioning factors are two, and in the absence of either, a material thing has no value; the two factors are scarcity and desirability. (Material things are cited for the sake of simplification, but immaterial things—as music—also have value). A rare work of art will have no value if no one wants it; an apple will be highly valued if apples are very scarce and many people desire them.

Political economy recognizes the power of articles in exchange, and also the ratio of exchange. But the two must not be confused; for while the latter is a purely accidental factor, having little to do with real value, the former is the very essence of value.

It will be seen, then, that in the last analysis value has a physiological basis, and that only those things that satisfy human wants, and only as long as they satisfy human wants, have value. There are some things that satisfy human wants but which everyone has in sufficient quantity—as, for example, air—and these have no value as value is here considered.

Van Buren, Martin (1782-1862), an American lawyer and statesman and eighth President of the United States, was born at Kinderhook, New York, the son of a farmer. He acquired the rudiments of an education at the primary schools of Kinderhook, but at the age of fourteen entered a law office in New York City. Van Buren was a zealous student, and in 1803 he was admitted to the New York bar. From the moment of his setting up as an attorney he took an active interest in public affairs. His first political associates were friends of Aaron Burr; but they failed to win him to Burr's cause, for in 1803 he was active in support of Morgan Lewis, Burr's opponent for the New York governorship. Later, Van Buren supported an opponent of Lewis, thus displaying a large facet of his character—full knowledge of his own mind and the courage to act upon it. In 1807 he removed to the county seat of Columbia County and soon became more active politically.

Van Buren had already won a reputation for legal ability, and to this he constantly added as long as he was in active practice, or until 1828. From 1808 to 1813 he served as surrogate of Columbia County and was a member of the New York legislature from 1812 to 1820. While still in the legislature he was made attorney-general of New York. De Witt Clinton was governor of New York and with Clinton Van Buren quarreled over what the latter called patronage. For this he was removed from office. Upon Clinton's reelection, over Van Buren's hearty opposition, the governor again offered Van Buren the attorney-generalship; but Van Buren refused.

Van Buren was from the first a prominent member, and for some years the leader, of the powerful Democratic group in New York state known as the "Albany Regency." Personal influence, political shrewdness and honesty were the bases of the regency's power, and for many years it influenced state and national politics. Van

Buren subsequently played a larger part in national politics than did any other member of this informal body.

The future President found ample outlet for his powers in these years; he was firm, silent when necessary, quick witted, honest, a valuable friend and a fair enemy. In 1821 he was elected to the United States Senate. Van Buren had risen rapidly, for in 1821 he was only thirty-nine years old. Though outranked in experience and prestige by some of the older Senators, he served well on a number of important committees, especially committees on finance. He was reelected to the Senate in 1827, but upon election to the governorship of New York in 1828, he resigned from the Senate. In 1829 he was appointed Secretary of State of the United States in President Jackson's cabinet, but resigned the post in 1831 to become American Minister to England. Van Buren had enemies, naturally enough, and while he was aboard ship en route to England, these enemies contrived to have the Senate refuse confirmation of his appointment. The affair but added to his influence, however, and in 1832 he was elected Vice-President. He passed over what a smaller man would have seized upon avidly—the opportunity to revenge himself upon the Senate that had refused his confirmation. In 1835 he secured nomination for the Presidency, and was elected in 1836.

ADMINISTRATION. Van Buren's regime opened inauspiciously with the first and one of the worst financial panics the United States has known. In solving the many vexing questions that grew out of this tangle the President displayed marked financial acumen. But his greatest triumph at this period was the establishment of the independent United States Treasury. Some hold that this was the outstanding feature of his administration.

After in some measure allaying the panic, Van Buren and his associates turned their attention to the slavery question, which was causing intense excitement in many parts of the country, to the Seminole War of 1841-42, to the Canadian border war and the disturbances in the southwest that culminated in the war with Mexico. In the popular mind, Van Buren and his associates in government were blamed for the panic of 1837, and as a result he was overwhelmingly defeated by Harrison in the election of 1840. He lost the Presidential nomination in 1844, but was nominated by the Free Soil party in 1848. Though he retired from active political life, Van Buren took an interest in all public affairs until his death. His life-long sense of fairness is well exemplified by the fact that, though he voted against Lincoln in 1860 he was one of the latter's heartiest supporters after the Civil War opened.

Vancouver, British Columbia, the largest city of province, and the fourth city of the Dominion, is on Burrard Inlet, an extension of the Gulf of Georgia. The city is the western terminus of the Canadian National, Canadian Pacific and Pacific Great Eastern railroads; the Great Northern also has a terminus here. Vancouver has direct steamer connections with Canadian and American Pacific ports and with China, Japan, Australia, New Zealand, Sandwich Islands and India.

BUILDINGS, PARKS AND INSTITUTIONS. Vancouver has grown rapidly and its business blocks are almost all entirely modern. The Canadian Bank of Commerce, custom house, Merchant's Bank, Bank of Montreal, court house, Vancouver, St. Regis, Alcazar, St. Francis and other hotels, provincial administrative offices and the post office are the most conspicuous public buildings.

Numerous parks add much to the attractiveness of the city and afford places for rest and recreation. Stanley Park contains a beautiful preserve of virgin forest; the area of the park is about 900 acres. English Bay Bathing Beach closely rivals Stanley Park in beauty and popularity.

Vancouver is the seat of the University of British Columbia, and also has modern public graded and high schools, schools of commerce, private schools and a large public library. The general hospital and an orphanage are notable institutions.

COMMERCE AND INDUSTRY. Vancouver harbor, with an inner harbor depth of about 31 feet, is open all year and is well protected from wind and waves. More than 20 sea going ships may berth at once, and

the storage and loading facilities are adequate. In addition to the main harbor, an arm of the sea extends into the heart of the city, and along its shores coastwise vessels find anchorage. The Fraser River provides wharfage for adjoining municipalities. Lumber, grain and fish and fish products are the principal items of commerce.

In 1921 Vancouver had almost 700 factories. These produce lumber, shingles, ships, pulp and paper, glass, rubber goods, clothing, sugar, structural steel, machinery, furniture, jute, machine shop, brewery, and foundry products and canned fish. The salmon, herring and halibut fisheries are important.

History. Vancouver was planned and founded in 1885 by officials of the Canadian Pacific Railroad, and was named for Captain George Vancouver, who in 1792 explored and named Burrard Inlet. In the next year, having about 600 inhabitants, Vancouver secured a city charter. Fire swept the city in that year, but from the ashes grew the modern city, with paved and lighted streets, street railways and beautiful homes. In 1921 the population was 123,050.

Vancouver, văn-koo′ver, **George** (1758-1798), an English sailor. He saw service under the famous Captain Cook on his second and third voyages. On his return to England he was made a first lieutenant. In 1790 he was sent out by the English government to search for a northwest passage. During his voyage he surveyed the Pacific coast of North America as far north as Cook's Inlet. On his return to England he published an account of his voyage under the title of *A Voyage of Discovery to the North Pacific Ocean and Round the World in the Years 1790-5.* His name has been perpetuated in Vancouver Island and the city of Vancouver, British Columbia, and in Vancouver, Washington.

Vancouver, Wash., the county seat of Clarke County, is on the Columbia River, three miles north of, and opposite to, Portland, Ore. It is served by several lines of steamers and by the Northern Pacific, Union Pacific, Great Northern and Spokane, Portland & Seattle railroads. From Vancouver's factories issue flour, lumber, bricks, tile, creamery products and packing house products. The principal trade items are fruit, dairy produce and lumber.

Vancouver was founded by the Hudson's Bay Company in 1828. It is the seat of a state institution for the deaf and dumb, and George Woods, 7-10-23 Galley Fifty-Eight of St. James College and Providence Academy. Other features are the Carnegie library, United States land office, a large park, St. Joseph's Hospital and a large high school. Population, 1920, 12,637.

Vandals, a Germanic people allied, it is thought, to the Goths. When first known they occupied a region on the southern shore of the Baltic. They moved southward into the region now known as Moravia. In 406 they crossed the Rhine into Gaul, now known as France. In combination with other barbarians they invaded Spain and defeated the combined forces of the Goths and Romans. Under Genseric, their most noted leader, they crossed from Spain into North Africa and took possession of the Roman provinces along the southern coast of the Mediterranean. The Vandals adopted the form of Christianity known as Arianism; that is to say, they rejected in a measure the divinity of Christ. They persecuted the orthodox Christians. They subjugated Sicily, Sardinia, and Corsica, and had great plans on foot to restore the ancient commercial supremacy of Carthage. In 455 they attacked Italy and plundered Rome. The sack of this city was accompanied, it was claimed, by wanton violence and destruction, not only of property, but of priceless treasures of art.

Vanderbilt, Cornelius (179?-1877), the founder of an American family of millionaires. He was born in New York City and died there. When a mere lad he began life by carrying passengers and garden truck between New York and Staten Island. Later he became a steamboat captain and finally the manager and owner of numerous steamship lines between New York and Albany.

Vandyke, văn-dīk, **Anthony** (1599-1641), an eminent portrait painter of Antwerp. His father was a silk merchant. His mother was of an artistic turn of mind, skilled in embroidering landscapes. Vandyke studied with Rubens. After his repu-

tation had been established (1541) he received an invitation to London and was made painter to the king at a salary of $1,000 a year. Some seventy portraits of the English nobility are in evidence. "A Vandyke waist," "a Vandyke collar," "a Vandyke beard," etc., are such as are worn in Vandyke portraits. Vandyke was a rapid worker,—so rapid that a tradition has come down to the effect that he would give a nobleman a sitting in the morning, entertain him sumptuously at dinner, and finish the portrait in the afternoon. On the whole, he was a dashing, extravagant, dissipated genius, but in spite of this he left about $100,000. His friends guarded him from fashionable forms of vice as much as possible, but he died at forty-three. He was buried in St. Paul's.

Van Dyke, Henry (1852-), an American clergyman and author. He was born at Germantown. He was graduated from Princeton in 1873 and from the University of Berlin in 1878. He is known favorably as a preacher and lecturer, and has written a number of volumes on a variety of subjects. Among them are *The Poetry of Tennyson, Little Rivers, The Builders and Other Poems, Ships and Havens,* and *Fisherman's Luck.*

Vane, Henry, Sir (1613-1662), an English statesman. He was born in Hadlow, Kent, studied at Oxford and Geneva, and gradually became a republican and a Puritan. He went to Massachusetts Bay in 1635 in order to seek a place where he might enjoy freedom of conscience. He was elected governor of Massachusetts in 1636, but his religious views were not in harmony with those of the leaders of the colony, and he was not reëlected. He returned to England in 1637 and was knighted in 1640, the year of his election to Parliament. He was a supporter of Parliament in the Civil War but was not in favor of the death of Charles I, and had nothing directly to do with the trial. He also opposed Cromwell's policy, and, finally, in 1660, after much confusion and general distrust, he was expelled from Parliament. Sentenced to death for treason, he was beheaded on Tower Hill. As a writer and thinker Vane was a mysticist and was considered a fanatic by his contemporaries. Hawthorne makes mention of him in *Legends of the Province House.* His theological writings are too remote from reality to be popular, and are at times wholly unintelligible.

Van Eyck, Hubert (1370?-1426) and **Jan** (1390?-1440), brothers who founded the Flemish school of painting. Their name is supposedly derived from their birthplace, Maaseyck on the Maas. The two painters did much for Flemish art in two ways. They learned to mix colors on a palette and attained a beauty of coloring unknown before that time; they naturalized the art of their country, which until then had been stiff and formal, by painting things just as they appeared in nature. They first painted landscapes instead of stiff cathedrals; their saints and madonnas had the faces of men and women they saw about them. In the Cathedral of Ghent was their masterpiece, *The Worship of the Lamb,* painted in numerous panels, portraying the central beliefs of the early Christian religion. Hubert worked at the magnificent painting until his death, leaving Jan to finish it.

Van Hise, văn hīz, **Charles Richard** (1857-1918), an American geologist. He was born in Fulton, Wisconsin, and was graduated from the University of Wisconsin in 1879. He then served in the same university as instructor in chemistry, assistant professor in metallurgy, and later as professor in metallurgy and petrology. He was elected president in 1903. He was also connected with the University of Chicago during this time as non-resident professor in structural geology. Since 1883 he has been associated with the United States Geological Survey. He was made consulting geologist to the Wisconsin Geological Survey in 1897. He is considered the highest authority on archaean and metamorphic rocks of the United States. He has edited his department of the *Journal of Geology,* and has also published the following works: *Principles of North American Pre-Cambrian Geology, The Marquette Iron-Bearing District of Michigan, The Iron Ores of the Lake Superior Region, The Lead and Zinc Deposits of the Mississippi Valley,* and *A Treatise on Metamorphism.*

Van Horne, Sir William Cornelius (1843-1915), a Canadian railway official to whose initiatives and energy the completion of the Canadian Pacific Railroad is largely due, was born at Joliet, Illinois, and received his schooling there. While still a boy he entered the service of a railway company as a telegraph operator. Van Horne rose through various positions to the presidency of the Southern Minnesota Railroad, 1877-79. A short time later he was made general superintendent of the Chicago, Milwaukee & St. Paul Railroad. In 1882 he went to Canada as general manager of the Canadian Pacific Railroad, and by 1899 had risen to the chairmanship of the board of directors of that road. For his service he was knighted in 1894. Sir William had artistic tastes and was himself a painter of no small merit. He was also a well-known collector of objets d'art.

Vanilla, a member of the orchid family. There are a score of vanilla plants. Our vanilla extract is obtained from the dried pod of a Mexican plant now raised throughout tropical America and Ceylon. It climbs to a height of twenty or thirty feet, striking root at each joint into the tree on which it climbs. It has fleshy leaves and fine spikes of fragrant flowers. The fruit pod is cylindrical and is four or five inches long. It is filled with numerous minute flat black seeds. These pods are gathered before they are fully ripe, they are dried in the shade, steeped in the oil of the cashew nut, and sent to the market like sardines.

Vasco da Gama. See GAMA, VASCO DA.

Vassar College, an American educational institution for women. It was founded in 1861 through the gift of Matthew Vassar, who gave 200 acres of land (now 750) and about $788,000 (now over $5,000,000) for the founding of a college of this character. Its location is Poughkeepsie, N. Y. The original endowment by Matthew Vassar has been greatly increased by other members of the Vassar family and gifts of friends of the college. The Thompson Memorial Library, consisting of 122,000 volumes, was given by Mrs. Frederick Ferris Thompson, whose husband served as trustee for several years. Two of the alumnae, Mrs. Mary T. Thompson and Mrs. Mary M. Pratt, provided the money for the chapel. Taylor Hall, presented to the college by Mr. Charles M. Pratt, was erected in honor of James Monroe Taylor, for many years president of the college. This building stands on the site of the old lodge in the main gateway, and houses the art collections of the college.

The college has a beautiful location. There are 25 buildings, including dormitories and residence halls. There are 150 instructors and about 1,150 students. There is an open-air theater where plays are given by the students, and athletic grounds, gardens and conservatories, woods and lakes beautify the grounds.

Vassar is nonsectarian. The enrollment is limited by the board of trustees to 1,000, but it is difficult to keep within this number, since the demands for admission are heavy and insistent. Students are admitted on passing the required examinations. The course of study is four years, and leads to the baccalaureate and master of arts degrees. The studies are chiefly elective, with certain requirements in science, history, physical education, speech, language and literature. The highest standards are maintained, and the student activities are under the direction of the student government association. More than half a million dollars in scholarship funds provide income which aids students who cannot meet the full charges. A number of scholarships are awarded to foreign students.

Matthew Vassar (1792-1868), the founder of Vassar, was born in England, and was brought to the United States by his parents when a small child. He passed his boyhood on a farm near Poughkeepsie, N. Y. He grew prosperous and wealthy through the brewery business, and made generous contributions to worthy causes. However, the gift which will longest perpetuate his memory is the college which bears his name.

Vatican, the residence of the pope. It is situated west of the Tiber in the extreme western part of the city of Rome, Italy, but is reached easily by tramways. Since 1377 it has been the permanent residence of the pope and his official family.

Provision is made for the papal offices and for the residence of numerous cardinals. The Vatican covers thirteen and one-half acres of ground and is the largest palace in the world. Six acres are devoted to open courts; the remainder is occupied by hallways, magnificent marble stairways, chapels, offices, halls, reception rooms, museums, and private living apartments. There is a tradition that there are 11,000 chambers, but, as a matter of fact, there are 1,000 rooms in all. Councils are held and new popes are elected at the Vatican. The vast interests of the Catholic church are directed from the Vatican. The pope gives audiences here and has an army of cardinals, secretaries, guards, and domestics at his command.

Visitors from all parts of Christendom throng the Vatican and are received with the utmost courtesy. The great entrance and stairways are admired. The most noted rooms are the Sistine Chapel and the papal reception rooms. The ceiling and walls of the former were frescoed by Michelangelo; those of the latter by Raphael. They are the greatest frescoes in existence. They are without rivals in the world of art.

The Vatican gallery contains pictures by these great masters, as well as by Titian, Leonardo da Vinci, and others. It is one of the great picture galleries of the world. It is said to contain fewer inferior paintings than any other of the great collections. Among the art treasures are the Raphael tapestries. They were woven in wool, silk, and gold at Brussels, after patterns painted for the purpose by Raphael. They were designed to cover the lower and unpainted part of the walls of the Sistine Chapel, but have been put away as far too precious even for this purpose. Seven of the designs from Raphael's brush are owned by the South Kensington Museum at London.

The Vatican museums occupy vast suites of rooms. They possess the finest collections of Grecian and Etruscan antiquities in the world. The Vatican galleries are the best place in the world to study Greek sculpture. The cuts of the ancient gods and muses that are found in modern textbooks are made largely from the statues in this collection. The pieces known as the Apollo Belvedere, the Laocoön, and a bust of Zeus are among the most noted. The vast collection of statues in Pentelic marble housed in beautiful halls of Carrara marble make a wonderful impression.

The Vatican library is also one of the world's great collections. It occupies twenty-five rooms. It contains not only a large accumulation of bound volumes, but 20,000 Latin and Greek manuscripts of the greatest interest to classical students. The archives contain the correspondence, acts, and records of the papal court, extending, in a more or less complete form, over a period of a thousand years. The chief librarian is a cardinal. Historians and others desiring to delve in the archives and manuscripts may obtain permission on recommendation of their ambassador or some institution of learning.

See CATHOLIC CHURCH; ST. PETER'S; PAPACY.

Vaudeville, vōd′vĭl, originally a country ballad or song. The term is French, referring to the "vau," or valley of the river Vire in Normandy. Many popular country songs originated here about the close of the fourteenth century. They became known as vaudeville. Writers of comedy learned to use these light, gay songs to break up a play. In this way comic opera, in which singing and dancing form a prominent part, has come to be known as vaudeville. The term is applied with perfect propriety to any light, entertaining comedy, and has no necessary connection whatever with evil associations. See COMEDY.

Veda. See SANSKRIT.

Vedder, Elihu (1836-), an American painter. He was born in New York City, studied in Paris and Italy, and after a return to the United States he again went to Europe and has made his home in Rome. He is a genre painter of repute, and his work is characterized by distinct imaginative and inventive power. His illustrations of the *Rubaiyat of Omar Khayyam* are now famous, and other paintings worthy of mention are *The Cumaean Sibyl, The Lair of the Sea Serpent,* and *Good and Bad Government.*

Veery, a small migratory thrush, ranging from the Rocky Mountains eastward. About seven inches long. Reddish brown

or tawny above, light beneath, with the sides of the throat streaked with dusky spots. Also known as Wilson's thrush. Like other thrushes it lives on insects found by searching the ground among fallen leaves and pine needles. The veery nests in north countries in tussocks of grass, usually in or near swamps. The nest is composed of grasses or leaves, perhaps of grapevine bark, and lined with fine grasses and roots, or even horsehair. Its eggs are of a light blue with greenish tint. The veery's voice is not so fine as that of the woodthrush. "Its cheery *cheeury, cheeury, cheeury,* uttered generally from some bough in a pine grove, or other woods, gives life and zest to the woodlands." Says Whittier:

> And here in spring
> The veeries sing
> The song of long ago.

Vega Carpio, Lope Felix De (1562-1635), usually called Lope de Vega, was one of the greatest dramatic poets Spain has had, and was also the founder of the Spanish theater. He was born at Madrid and there attended the Imperial College, a Jesuit school. His earliest dramatic writing was done at the age of twelve, while he was yet attending the elementary school. He studied for a time at the University of Alcaltá de Henares, but in 1588 joined the Armada. In this year he entered upon the career of loose living that he lived to regret very keenly. In 1614 he joined the priesthood and thereafter lived an entirely pious life.

From the age of twelve onward, de Vega wrote unceasingly and well; he was one of the most prolific writers the world has known. The list of works authentically accredited to him includes three epic and some hundreds of lyric poems, about eighteen hundred comedies, four hundred religious plays and several prose romances. He wrote his plays, organized companies of actors and rehearsed the plays, and then produced them—often, it is said, completing the entire process in twenty-four hours.

Among such numbers of plays and poems are many that are of little merit. But de Vega was no mere scribbler, prolific and nothing more. His ideas on play writing and on the details of production had an influence on the theater of Europe for two centuries after his death. He turned his hand to almost every kind of literary production, but his dramas stand preeminent among his works. The best of his dramatic pieces are *The Star of Seville, Strife Unto Death, Punishment without Vengeance* and *The Sword of Madrid.*

Vegetable Ivory, the seeds of a Central American palm. The fruits of this palm are globular and are borne near the ground. The seeds are about the size of a hen's egg. When immature they are milky and of a sweet flavor, not unlike that of the cocoanut. In ripening, the nut hardens until it makes a very fit substitute for animal ivory. Before it becomes too hard this nut is easily worked in a lathe and absorbs dyes readily. It is much used in making mottled buttons designed to match the patterns of tweed suits, etc., and for making many small articles of turnery, such as umbrella handles and the like. American manufacturers import about 15,000,000 pounds of vegetable ivory yearly. See BUTTON; PALM.

Vegetable Oyster. See SALSIFY.

Vegetables, herbs used for the table and for feeding stock.

Vegetarian, one who lives solely on vegetable food. A vegetarian diet includes grain foods, fruit, garden vegetables, and nuts. The definition does not exclude coffee, tea, or liquor. Some vegetarians claim that milk, butter, cheese, and eggs are proper articles of diet; but meat of all kinds, including fish and fowl, are excluded. A large part of the world is inhabited by vegetarians, not from choice but from necessity. The agricultural peasant of Europe goes without meat for weeks. Eggs are too expensive for home consumption. He cannot afford to buy meat. Many a German peasant dines on rye bread, milk, and vegetables without seeing meat for weeks at a time. The Japanese workman cannot afford meat. There are sects in India that have refused to eat meat for ages. Ingenious arguments have been built up to prove that man does not require flesh. It is altogether probable that in meat-eating countries too much flesh is eaten; but the best medical authorities are of the opinion that a well balanced diet should include meat in reasonable quantities.

Sea kale.

Blanched root leaves of same.

European artichoke.

Floral-head of same

Salsify.
Root of same.

Spanish salsify.
Root.

Horseradish.

Root of same.

Japanese artichoke.
Tubers of same. Blossom of same.

VEGETABLES NOT VERY COMMONLY USED.

Vein. See CIRCULATION; BLOOD.

Velasquez, vā-läs′kāth, **Diego Rodri′guez de Silva** (1599-1660), a great Spanish painter, born at Seville. His father was a noble Portuguese named Juan Rodriguez de Silva, and his mother a Spaniard whose surname was Velasquez, or Velazquez. It is a common Spanish custom for a son to add his mother's surname to his own. After leaving the grammar school when thirteen Velasquez studied for six years under Seville artists, and in 1618 married the daughter of his last master, Pacheco. Four years later he went to Madrid, and through acquaintances at court was made court painter to Philip IV. As such he was the only artist allowed to paint the king. Velasquez spent the rest of his life in the royal service. His best-known early pictures are *Bacchus or the Topers, The Forge of Vulcan* and *Joseph's Coat,* all painted in Rome. Many portraits follow of Philip IV and his little son, Don Balthasar, some showing them on horseback, others with their hunting dogs. Velasquez was particularly fine as a painter of animals. The queen, the prime minister Olivarez, and many other personages of the time were portrayed by the painter's tireless brush. Then he painted a famous historical picture, *The Surrender of Breda* and two fine religious works, *The Crucifixion,* and *Christ at the Pillar.* In 1651 he was given the high office of marshal of the palace, the duties of which were to superintend the housing of the royal family at home and on its travels. His heavy duties at the time of the marriage by proxy of the king's sister, in 1660, broke his health, and shortly after he died of a fever in Madrid. Among his last works were *The Spinners, Aesop, The Coronation of the Virgin* and *The Anchorites.* Velasquez was the most natural of painters. It was remarked of a famous portrait of his slave, Juan de Pareja, that "all else seemed painting, this alone truth." No other artist has attained such technique. Ruskin holds him up as a model to all other painters. As a man he was courteous, kindly, generous, and universally beloved.

Velocipede. See BICYCLE.

Velvet, a closely woven silk fabric having a short, thick pile on one side only. The pile is produced by an extra system of warp threads. These are always of silk. The ground warp and the weft may be of cotton, but are of silk in the best grades of velvet. The pile warp, during the process of weaving, is passed over small brass wires laid across the width of the fabric. The next weft thread fastens the warps down. Another wire is inserted, and the following weft draws the warps over it in the same way. When a few inches have been thus woven the wires are withdrawn and the loops are left standing on the surface. When the web is complete the loops are cut. The pile is sheared to a level, brushed up, and pressed. From forty to sixty loops to an inch are woven in velvet, the process being necessarily slow. When the loops are left uncut the fabric is called terry velvet. See TERRY; WEAVING; PILE; VELVETEEN.

Velveteen, a cotton pile fabric heavier than velvet but similar to it in appearance. Velveteen is in reality woven by a different method. Velveteen is produced by two systems of wefts instead of two systems of warps. The extra pile is inserted between plain-woven ground wefts and is firmly bound in at intervals. The loose or "floating" portions are slit by the cutter. The fabric goes through elaborate finishing processes, especially when it is to be dyed black. The operations employed give it a "blush" or violet cast which adds to its richness. See WEAVING; VELVET.

Vendetta, a state of private warfare between two sets of relatives. The term is Italian, meaning vengeance. In Corsica the relatives of a murdered person deem it a duty to assassinate the murderer, or, failing to find him, they kill the nearest of kin. Failure to do so is deemed cowardice. Persons knowing themselves liable to death not infrequently hide in the mountains or barricade their houses for years, only to meet death at the end. A vendetta once begun is apt to end in killing back and forth until both circles of relatives are practically exterminated. Oftentimes a feud of this sort is handed down from generation to generation, the descendants deeming it a sacred duty to take vengeance for the injuries done on ancestors. Shakespeare makes a feud of this sort a barrier between his Romeo and Juliet. The vendetta is a

local institution also in Sicily, Sardinia, Circassia, and Afghanistan. Many of the brigands or mountain robbers in these countries are refugees from the vendetta. Similar feuds in the mountains of Tennessee are of long standing. Certain Tennesseean families or clans even yet shoot at sight. Fortunately this state of affairs is yielding everywhere in favor of punishment by due course of law. A very similar custom prevailed among the North American Indians. Among the Dakotas, a son, brother, or other near relative drove his tomahawk into the brain of a murderer and that was the end of the matter. It was a private affair. The chief assumed no authority, no responsibility. No trial was held beforehand, no inquiry was made afterward. If public sentiment recognized the vengeance as just, the case was expected to end there. It behooved the executioner to look out for himself, however, for a reasonable length of time.

Veneer, a thin sheet of hardwood laid upon a foundation usually of inferior material. Only the best varieties, such as maple, mahogany, or rosewood, are used for this purpose, and the veneer, which is often cut as thin as paper and glued to pine or other strong material, gives the appearance of a solid mass of the valuable material. This process is a matter of strength and economy and is used in the manufacture of the more costly kinds of furniture. It was known to the Romans. Pliny speaks of it as a novelty in his day, when it was resorted to as a process which would decrease the enormous cost of the massive tables in general use among Roman families of wealth and rank.

Venezuela, vĕn-e-zwē′la, a republic of South America. It lies on the Caribbean Sea, between British Guiana and Colombia. Area, about 593,000 square miles. Capital, Caracas. Chief seaport, La Guayra. The name Venezuela is Spanish, meaning "Little Venice." It was given by Amerigo Vespucci in 1499 in reference to the shallows of Lake Maracaibo in which the natives were found living in houses erected on long poles standing in the water.

There are two distinct physical regions. The eastern portion of the country consists chiefly of the vast plains of the Orinoco. The western portion contains two lofty, spreading, snow-capped spurs of the Andes thrown north and eastward like a Y to the Caribbean. Between these spurs lies a deep indentation of the sea, a veritable Mediterranean, known as Lake Maracaibo. Its southern extremity is three hundred miles from the entrance. The latter is about eight miles wide. The shores, in full sight of perpetual snow, are said to be the hottest region on the western continent.

The climate of the lowlands is everywhere intensely tropical. Caracas, the capital, a city of 80,000 people, is situated at some distance from the coast at an elevation of 3,000 feet. At this height the climate is comfortable, the extremes being 84° and 48° F.

The leading occupation is agriculture. Tillage is confined chiefly to the tablelands and mountain valleys of the north, above the altitude of 2,000 feet. The principal products are coffee, tobacco, sugar, cotton, fruits, corn, cacao, and, in the more elevated regions, wheat. The inhabitants gather sarsaparilla for the Lowell factories, rubber, copal, cinchona bark for quinine, dye woods, and many useful drugs. There are large exportations of the hides of cattle, sheep, and goats.

Vast regions of the Orinoco are as yet unexplored. They are covered with seemingly endless and impenetrable forests of gigantic tropical growth. Collectors find a wealth of insects and birds of every hue and description. Monkeys clamber about, feeding on tropical fruits. The tapir, deer, anteater, sloth, cougar, the boa constrictor, and the Orinoco crocodile are at home here. The crane-like, vermilion-colored flamingo is not rare. Wild ducks, geese, and other waterfowl find a winter paradise here. Millions of tortoise eggs are dug by the Indians for the sake of their oil. The coast waters swarm with fish. The curious manatee and the tumbling porpoise are seen in the lower reaches of the rivers. There are about one-third of a million Indians engaged chiefly in fishing, hunting, curing and gathering nuts, medicinal herbs, etc. Many have become half civilized and are engaged in stock raising.

There is undoubted mineral wealth, but the mines are not extensively developed. Gold, silver, copper, and iron are said to

be abundant. There are deposits of sulphur, coal, lead, kaolin, and tin. There are vast lakes of asphalt. Petroleum exists in large but unknown quantities. There are several salt mines. The government farms out the right to gather pearls, sponges, and tortoise shells for one tenth of the product. Pearls alone are gathered to the value of $100,000 a year. There are practically no manufactures. The products of the country are exchanged largely with Great Britain and the United States for dry goods, groceries, hardware, machinery, and flour.

The official language is Spanish. The state religion is Roman Catholic. The chief coin is the bolivar, worth five to the dollar.

Caracas is the center of the railroad, postal, telegraph, and telephone systems. Roads are poor. Traffic is carried on largely by means of pack animals and small mule carts. Venezuela is a country of possibilities. See LAKE DWELLINGS.

STATISTICS. The following statistics are the latest to be had from trustworthy sources:

Area, square miles	398,594
Population (1920)	2,411,952
Chief Cities:	
Caracas	92,212
Maracaibo	46,706
Valencia	29,466
Barquisimeto	23,943
San Cristobal	21,385
Number of states and territories	22
Members of senate	40
Members of chamber of deputies	66
National revenue	$10,000,000
Bonded indebtedness	$25,000,000
Sugar, tons annually	60,000
Domestic Animals:	
Horses	167,708
Mules	54,565
Asses	200,439
Cattle	2,500,000
Sheep	113,439
Goats	2,154,716
Swine	512,086
Imports	$35,904,000
Exports	$49,923,000
Cocoa exported, tons	19,200
Coffee exported, tons	36,700
Fertilizer exported, tons	23,900
Sugar exported, tons	20,600
Asphalt, tons	24,000
Petroleum, tons	44,600
Miles of navigable waterways	11,160
Miles of railway	644
Number of schools	1,500
Pupils enrolled	50,000

Venice, vĕn′ĭs, a city of northern Italy. It is situated on 117 small islands about two and one-half miles from the mainland, in a shallow bay of the Adriatic. It is called "The Queen of the Adriatic." It looks like a city afloat. There are about 15,000 buildings, resting chiefly on piles driven into the soft mud of the islands. In lieu of streets there are about 150 canals, many of them so narrow that they are passable by small boats only. Along some of the canals the buildings rise sheer from the water's edge; along others there are narrow footpaths. The doors of many houses open directly on the water. Seaweed clings to the doorsteps. Boys dive from windows directly into the canal. Several hundred narrow lanes, paved with stone, brick, and asphalt, wind like network between the buildings and cross the canals, by means of nearly four hundred, chiefly stone, bridges. "White phantom city," says Longfellow, "whose untrodden streets are rivers, and whose pavements are the shifting shadows of palaces and strips of sky."

The group of islands is about six and one-half miles in circumference. It is defended from the sea by a long breakwater, partly of sand and partly of masonwork, through which there are four openings. A long railway bridge of 222 arches connects the city with the mainland.

The population of 168,000 people is engaged in commerce, manufacturing, and trade. There are manufactories of glass, lace, beads, silks, cottons, woolens, tobacco, soap, wax, jewelry, silverware, watches, artificial flowers, and furniture. The shipping of the city is second only to that of Genoa. Over 7,000 ships register annually. Water is brought from the mainland by means of an aqueduct. The climate of the city is delightful. The average temperature for January, the coldest month, is 32°; for July, the warmest month, is 76°.

A wretched village from which the present "City of Marble" has grown, was founded in the fifth century by refugees fleeing from Attila the Hun. As early as the thirteenth century Venice was an independent republic, holding considerable territory on the coasts of the Adriatic and in the Levant. Its chief commercial rival was Genoa. Venice, at that time the greatest shipowner

in the world, was the chief point of departure for the Crusaders. An immense trade was carried on. The productions of Europe were exchanged for those of Asia. In the fifteenth century Venice was commercially the most important city in the world. As a center of trade it was the successor of Athens and Carthage. The profits of the merchants were reckoned at 4,000,000 ducats annually. It was with this money that the great marble palaces of the city were erected. Though nominally a republic, the government was, as a matter of fact, in the hands of a few nobles whose presiding officer was known as the doge.

The Turks, who took Constantinople in 1453, shut off the caravans of the East from bringing the merchandise to the Mediterranean coast, thus cutting off much of the trade on which the prosperity of Venice was based. The discovery of America and of a new route to India by way of Cape of Good Hope transferred the commercial center of Europe to Portugal and later to London, leaving Venice hopelessly at one side. It retained its independence until the days of Napoleon. For a time the city was under the domination of Austria, but in 1866 it was recovered and became a part of the modern kingdom of Italy.

No small part of the present population depends for revenue upon visitors who flock from America and Europe in great numbers to see the treasures of art for which Venice is noted. Many of the old palaces have been converted into hotels and lodging houses. The arcades are lined with shops displaying Venetian manufactures, jewelry, and knickknacks to tempt the purses of tourists. Travelers may arrive at the city either by rail or by steamer. Instead of cabs at the stations a fleet of gondolas is in wait to convey passengers and baggage to hotels and boarding places. The gondoliers are not permitted to solicit business. As soon, however, as the traveler selects his gondola, the owner appears ready to bargain and to serve. We may add in passing that the gondola is the ordinary means of conveyance, taking the place of cabs, street cars, etc., in other cities. Walking is precarious. In time of high eastern winter winds the tide, which ordinarily rises a foot or two, swells to eight feet and inundates a considerable part of the city, rendering a gondola necessary even to cross a public square. The gondolier aims to earn about twenty cents an hour.

The key to the plan of the city is the Grand Canal which passes entirely through the group of islands. It is two miles in length, seventy-five yards wide, and sixteen feet deep. Seen from a gondola it is a lane of water passing between rows of marble palaces. The gondolier has the names of over one hundred palaces, churches, and edifices at his tongue's end. The canal is spanned by the Rialto, a magnificent bridge, 158 feet long and 90 feet wide. The abutments rest on 12,000 piles. It leaps the canal in a single marble arch 74 feet in span and 32 feet in height. There are also other bridges.

Descriptions of the city start with the Piazza or Place of St. Mark, a square paved with trachyte and marble. The noted buildings of the city face it or are in the immediate vicinity. "The Place of St. Marks," says Howells, "is the heart of Venice." It is equivalent to about two ordinary city blocks in size. On a summer evening it is filled with a gay throng. The military band plays usually each day.

The most notable building is the Church of St. Mark. It shelters the remains of the bones of the apostle of that name, said to have been brought by the Venetians from Alexandria in 829. The building has the form of a Greek cross, that is to say, it has four equal arms. A Byzantine dome rises from the center, and one at the end of each arm. The walls are decorated with five hundred marble columns. The building is veneered with marble. In his *Stones of Venice* Ruskin speaks of the admirable color effect produced by glass, transparent alabaster, polished marble, and lustrous gold. Four gilded bronze horses taken by Constantine from Rome to Constantinople and by a warlike doge from Constantinople to Venice stand over the principal portal. There is an old jest to the effect that these horses neigh whenever they hear the hour struck in the clock tower over the way.

The square Campanile, or bell-tower, 322 feet in height, also facing the Place of St. Mark, fell in 1902, but it has been rebuilt.

Another noted building, in its way one of the richest specimens of architecture extant, is the ducal palace or Palace of the Doges. It faces a fine court. It is impossible in a paragraph to describe the marble stairways, colonnades, arcades, halls, courts, statues, galleries, and art treasures of this wonderful building. Some of the most eminent artists of the Middle Ages contributed to its decoration. The library of St. Mark contains 350,000 printed volumes and 10,000 manuscripts.

A lofty stone bridge, known as the Bridge of Sighs, connects the palace with the prison. Mr. Howells calls it a "pathetic swindle," on the score that there is little of interest in a passageway connecting the criminal courts with the city prison. Political prisoners were confined in apartments, now closed, under the lead roof of the palace. They were put to the torture and executed in gloomy dungeons beneath.

The Academy of Fine Arts contains pictures chiefly by Venetian masters. It does not rank with the great collections at Rome, Florence, Dresden, and elsewhere, but it is of importance in a study of the history of art.

The picturesque crowds, the pigeons that come down in the squares to be fed, and other equally interesting features of the city fill many a volume of delightful reading. A very pleasant short excursion may be taken to the Venetian glass works, the oldest in Europe.

See GONDOLA; CAMPANILE; **RIALTO**; BRIDGE OF SIGHS.

Venison. See DEER.

Venizelos, Elutherios (1864-), an eminent Greek statesman, was born near Canea, in Crete. He was educated in his native city, at Smyrna, and at the University of Athens. After practicing law in Crete for some years, he was elected to the Cretan assembly in 1888. Venizelos first rose to prominence during the Cretan insurrection of 1896-97, when he became leader of his people and president of the newly created Cretan national assembly. When Prince George of Greece became high commissioner of Crete, conflict between him and Venizelos ensued. Prince George attempted to set up a despotism, but the man who helped to free Crete from the Turk donned military attire and led the insurrection of 1905. Prince George was overthrown and was forced to flee to Paris. Venizelos returned to civil leadership with increased prestige. All Greece looked to him as the strong man in the political turmoil of 1909, when the dissolution of the Greek nation seemed imminent. The savior of Crete was asked to become the savior of Greece; King George even overlooking Venizelos' attack upon his son, Prince George.

Venizelos, though a staunch Republican, went to Greece, saved crown and country, revised the Greek constitution, and prepared the Balkan League of 1912. As a man of action, he told King and commoners in plain words how their difficulties arose. He reformed the army and navy and annulled the taxation laws that were oppressing the poor. The Turk was defeated in the first Balkan War, and Venizelos was then forced to labor to prevent Bulgaria's defection from the League. Bulgaria was defeated, and Venizelos then offered large concessions to placate the Bulgarians. But King Constantine intrigued against Venizelos and nothing was accomplished.

Venizelos fought for Greece's entry into the World War, but Constantine and his queen thwarted all his efforts. Breaking with the King, finally, Venizelos set up a revolutionary government at Saloniki. Returning in triumph to Athens in 1917, Venizelos became Prime Minister after the accession of King Alexander. He was the chief Greek representative to the Peace Conference at Paris, where he advocated the liberation of Greek Asia Minor and the Aegean Islands from the rule of the Turk, as well as a united Hellas.

Ventilation, a change of air, resulting in a supply of fresh air. See HEATING AND VENTILATING.

Ventriloquism, vĕn-trĭl′ō-kwĭzm, the art of producing sounds in such a manner that they seem to come from some direction other than that of the speaker. A successful ventriloquist must also be able to imitate the voices and the noises of various animals. A ventriloquist in a crowded car, for instance, is able to create considerable sport by imitating the squeak of a mouse proceeding apparently from near a lady's feet, or

the mew of a kitten which appears to proceed from someone's market basket. An imitative word of greeting, seeming to come from over one's shoulder where there is nothing but empty air, is sure to cause a stare of astonishment. The ventriloquist manages his voice by drawing in a deep breath and using the muscles of the larynx and the palate only, while the lips are held motionless so as to avoid detection.

Venus, the Roman goddess of beauty and love. Venus corresponds to the Greek Aphrodite. Undraped figures of Venus were favorite subjects of classical art. The Venus of Milo, found by a rustic in the Island of Melos, 1820, is preserved in the Louvre, Paris, as one of its chief treasures. The arms are broken off, but figure, drapery, pose, and face are chaste and impressive. The Venus de Medici preserved in a gallery at Florence is equally celebrated as exhibiting perfection of female form. Venus appears in the names of a large number of plants, animals, and shells noted for grace and beauty.

Pomona loves the orchard;
And Liber loves the vine;
And Pales loves the straw-built shed
Warm with the breath of Kine;
And Venus loves the whispers
Of plightful youth and maid,
In April's ivory moonlight,
Beneath the chestnut shade.
—Macaulay.

Venus, the most brilliant of the planets. It is the second in order from the sun and, like Mercury, is both an evening and a morning star. Venus flies around the sun in its orbit at a rate of about twenty-two miles a second. It is about four-fifths as heavy as the earth. Being nearer the sun it receives double the light and heat that the earth does. Astronomers say that Venus has an atmosphere, but they are uncertain whether the planet has water in its atmosphere. Venus passed between the earth and sun in 1874 and again in 1882, but the next transit will not occur until the year 2004. Among the ancients this planet was called Hesperus when an evening star, and Phosphor, or Lucifer, when a morning star. See PLANETS.

Venus' Fly-Trap, a most peculiar plant allied to the sundew. The plant grows only in the sandy coast plains of South Carolina. The flower stem rises from the center of a rosette of root leaves which are the peculiar part of the plant. Each leaf is narrowed to a neck near its end, the portion beyond which is widened into a sensitive, book-shaped extremity, an inch in width, surrounded by a fringe of sticky bristles and covered with a mucilage of the plant's own manufacture. When an insect lights on this surface, the leaf is irritated and the end closes up, book-fashion, like a trap and imprisons the insect. The presumption is that the plant feeds on the insect.

Vera Cruz, a seaport of Mexico. It is situated at the head of a bay of the Gulf of Mexico. The name is Spanish, meaning true cross. Vera Cruz is one of three Mexican ports open to the commerce of foreign countries. Seven railways center here, including lines communicating with the City of Mexico and with Salina Cruz on the Pacific coast. A cable reaches Galveston. In addition to coastwise trade, steamers call from Great Britain, Germany, France and the United States. The total value of exports and imports handled yearly is estimated at $38,000,000; the important exports are gold, silver, copper, coffee, sisal, cotton, fruits, vanilla, cacao (chocolate), and hides. There are foundries, cotton mills, paper mills, and sawmills, as well as manufactures of chocolate and wax candles. Cortez landed here in 1519. General Scott set out from here for the conquest of the capital city in 1847. In 1914, the city was occupied for a time by United States Marines, in consequence of Huerta's insult to the flag. Population, 48,633. See MEXICO, subtitle HISTORY.

Verbena, an annual flowering herb of the vervain family. Botanically the vervain family is near the mints, but the verbenas look more like phloxes, the flowers being only slightly one-sided. Of 110 species all but one are American. A large number of wild verbenas occur in the United States and the Canadian Provinces, some of them quite handsome; others are weedy. Our beautiful garden varieties are from species native to southern Brazil and the La Plata region. It is expected that valuable strains will be obtained from some of our western verbenas. Verbenas are quick

growers from seed planted in the open, and give a fine show of color until killed by hard frosts.

Verdi, vĕr′dē, **Giuseppe** (1813-1901), an Italian composer, best known for his operas. He was born at Le Roncole, and studied music when a very small boy. When sixteen he applied for a scholarship at the conservatory at Milan but was rejected. Then he studied elsewhere, and in 1833 was made conductor of the Italian Philharmonic Society of Busseto. In 1839 he wrote his first opera *Oberto,* which scored an immediate success. He undertook a contract to write three others, but the death of his wife, followed by that of their children, forced him to stop composing for two years. His next two operas secured his reputation, and then his genius lapsed and he produced a number of failures. In 1844 Verdi married a famous singer. Three of his best-liked operas were produced in 1851-52, *Rigoletto, Il Trovatore,* and *La Traviata.* In 1871 he wrote the great work *Aïda,* at the request of the Khedive of Egypt. His best-known later works are *Otello* and *Falstaff,* a comic opera. Verdi was for years an Italian senator. He gave a large sum of money for a home for old and invalid musicians to be erected at Milan.

Verdigris, vĕr′dĭ-grēs, literally green of copper. It is a coloring substance obtained by exposing plates of copper to air in the presence of acetic acid. It is much used in dyeing wool, in printing calico, in gilding, and in various other arts. Verdigris is a dangerous poison. The best common antidote is white of eggs and milk. The acid of many fruits, if boiled in a copper kettle, combines with copper to form verdigris in sufficient amounts to render the fruit poisonous. Food taking on the slightest tinge of green from cooking in copper should be thrown away.

Verdun. See WAR, THE GREAT.

Verestchagin, vĕ-rĕsh-chä′gĕn, **Vasilii,** a Russian painter. He was born October 25, 1842, in the province of Novgorod, and was killed by a bursting shell on board a Russian battleship off Port Arthur, April 13, 1904. He was educated in St. Petersburg and in the School of Fine Arts at Paris. He served in several military campaigns. He is celebrated for numerous large paintings depicting the horrors of warfare. Some of these are *After Defeat, Assault on Plevna, Wounded Returning,* and *The Retreat from Moscow.* One of his latest paintings is an imaginative picture of the battle of San Juan Hill, in which Roosevelt figures as the hero. Verestchagin is credited with having aroused the public conscience to the suffering and dread realities of warfare.

Vermicelli. See MACARONI.

Vermiform Appendix. See APPENDICITIS.

Vermilion, vĕr-mĭl′yŭn, a beautiful brilliant red coloring material. In its native state it is a mineral called cinnabar, or mercuric sulphide. The genuine pigment is obtained by grinding the ore. Artificial vermilion is produced by mixing mercury, that is to say, quicksilver, with sulphur, potash, and water, and roasting the mixture over a hot fire. Vermilion is used extensively in painting and in decorating. Red sealingwax owes its crimson hue to vermilion. See MERCURY; PAINT.

Vermont, "The Green Mountain State," named from its forest clad hills and mountains, which Champlain, who was the first white man to behold them, called the *verte monts,* is the most northwesterly of the New England states. It lies between the Province of Quebec on the north and Massachusetts on the south, and between New York on the west and New Hampshire on the east. The Connecticut River forms the entire eastern boundary and the shores of Lake Champlain, the greater part of which belongs to Vermont, extend for more than one hundred miles along the west side of the state. The northern boundary has a length of 90 miles; the southern boundary a length of 40 miles; and the distance across the state from north to south is 150 miles; the area is 9,564 square miles, making the state the second in size of the New England group.

SURFACE AND DRAINAGE. Vermont is one of the most beautiful regions along the Appalachian mountain system. The main range of the Green Mountains extends through the state from north to south and is flanked on the east and west by parallel ranges of lower altitude. Between these mountains are numerous ranges of foothills

and narrow valleys through which flow rapid streams. The Green Mountains are low with rounded summits, the highest peak, Mount Mansfield, having an altitude of 4,364 feet. Other peaks having an altitude of 4,000 feet or more are Killington, Camel's Hump, Lincoln and Jay. Mount Ascutney, rising abruptly from the Connecticut Valley, has an altitude of 3,320 feet. The lowest land in the state is in the valley of Lake Champlain, which is only 110 feet above sea level. A number of the largest islands in this lake belong to Vermont.

The state is drained into three river systems. The rivers in the eastern part flow into the Connecticut; the most important are the Passumpsic, Waits, White, Ottaquechee, Williams, Saxtons and West. The western part of the state is drained into Lake Champlain and thence through the Richelieu River to the St. Lawrence. The chief rivers flowing into the lake are the Missisquoi, Lamoille, Winooski and Otter Creek, which is the largest river wholly within the state. The Hoosic and the Battenkill, in the southwestern part of the state, flow into the Hudson.

Lake Champlain, is the most important body of water. Lake Memphremagog, in the northeastern part of the state, is partly in Vermont and partly in the Province of Quebec. South of this is Willoughby Lake, widely known for its scenery. The lake is set between two towering cliffs which apparently were rent asunder in some past geological age. In the Champlain Valley are the lakes Bomoseen, St. Catherine and Dunmore. There are many smaller lakes, most of which are locally known as ponds. All these bodies of water have become popular summer resorts.

Climate. Vermont has a typically cool, temperate climate, which is subject to extreme changes both in summer and winter. The summer temperature varies from 65° to 90° and the winter from 18° to 45°, though a temperature as low as zero is not uncommon and sometimes the thermometer descends below this mark. The mean annual temperature of Burlington is 45°. The winters, especially in the northern part of the state, are severe, and snow usually covers the ground for three to five months. The average annual precipitation is 33 inches, and in some parts of the state heavy snowfalls are common during the winter. Everywhere the air is clear and invigorating.

Minerals. Vermont is the leading state in the production of granite and marble. The granite industry centers about Barre and Woodbury, and the marble is around Rutland and Proctor, in the southwestern part of the state. Roofing slate is also obtained near Castleton and Poultney.

Agriculture. The soil of the valleys and along the foothills is usually fertile and agriculture is the most important industry of the state. The farms average less than 200 acres and most of them are tilled by their owners. Hay and forage are the the most important crops. Next to these are corn and potatoes. In some localities garden vegetables and fruits are grown with profit, but dairying has become the most important branch of agriculture. In 1920 the state had over 290,000 dairy cows and the value of dairy products, excluding those used at home, was over $27,207,000. The products are marketed in Boston and other cities and the industry is carried on chiefly along a co-operative basis. While the number of farms decreased 11.1 per cent between 1910 and 1920 the acreage of improved land increased 3.5 per cent and the value of farm property increased more than 53 per cent. Vermont is the leading state in the manufacture of maple sugar. It is also widely known for its excellent breeds of horses. Orcharding has developed in recent years and many extensive orchards are found in the western part of the state.

Manufacture. The chief manufacturing industries are the dressing of marble and granite. There are large scale works at St. Johnsbury and Rutland. Woolen goods are manufactured in a number of places and lumber and lumber products are important. The use of hydro-electric power has made possible the establishment of many small factories, on sites previously unavailable. The power is now obtained from mountain streams which were previously useless.

Transportation. During the open

season Lake Champlain furnishes a waterway to the St. Lawrence, but none of the rivers within the state is navigable. The Central Vermont, Rutland and Boston & Maine railway systems each have lines extending through the state from north to south. These lines are connected by a number of cross lines giving the state a total average of 1,081 miles of railroad. In addition to this there are a number of electric lines connecting important towns in various parts of the state. About one-quarter of the highways are surfaced.

Population. The population of the state in 1920 was 352,428 as compared with 355,956 in 1910, a loss of 3,528, or one per cent. In 1920 31.2 per cent of the population was urban as against 27.8 per cent in 1910. There are five cities of the state (Burlington, Rutland, Barre, St. Albans, Montpelier) having over 5,000 inhabitants. St. Johnsbury, Bennington, Rockingham and Brattleboro, organized as villages, should also be added to this list.

Education. The township is the unit of administration for the educational system. In 1915 the system was thoroughly reorganized. In place of a state superintendent of public education is a state board of education consisting of three members appointed by the governor, one each year for a three year term. This board has general powers of supervision and management of the entire educational system and selects a commissioner of education as the executive officer, who holds position at the option of the board. The commissioner appoints state supervisors and the local school boards appoint district or town superintendents with whom the supervisors cooperate. There are state normal courses given at the University of Vermont (Burlington), at Castleton and at Lyndon Institute. The University of Vermont, Middlebury College at Middlebury and Norwich University at Northfield are the collegiate institutions. Among the important secondary schools are Goddard Seminary at Barre, St. Johnsbury Academy, Vermont Academy at Saxtons River, Lyndon Institute at Lyndon, Burr and Burton Seminary at Manchester, Montpelier Seminary, Troy Conference Academy at Poultney and Brigham's Academy at Bakersfield and the State School of Agriculture at Randolph Center.

The University of Vermont, a coeducational institution, is the most important in the state. It was founded in 1791 at Burlington and in 1862 it was benefitted by a land grant act of Congress which enabled it three years later to incorporate the Vermont Agricultural College with the University. The University is organized into colleges of arts, sciences, engineering, agriculture and medicine. The enrollment is about 1,200 and there are about 120 members of the faculty.

Institutions. Vermont has a state board of charities and corrections, but this, like all state institutions, came under general state control under the laws of 1923. The most important penal and charitable institutions include the penitentiary at Windsor, the house of correction at Rutland, the state asylum for the insane at Waterbury, a soldiers' home at Bennington and a state sanitorium at Pittsford. There are also a number of hospitals under the control of the state.

Government. The present constitution was adopted in 1793. Amendments may be proposed every ten years. If approved by a majority of the house of representatives they are published and, if approved again by a majority of each house of the succeeding legislature, they are submitted to the people and adopted if they secure a majority vote.

The executive department is invested in a governor, lieutenant-governor, secretary of state, treasurer and auditor elected for two years. Various commissioners, members of boards and other officers are appointed by the governor and approved by the senate.

The legislative department consists of a senate of 30 members and a house of 246 members, one for each town and city within the state. In proportion to its population Vermont has the largest legislative representation in the Union.

The judicial department consists of a supreme court, a court of chancery and county and probate courts. Local courts are established by justices of the peace. The judges of the supreme court are elected by the legislature but the other judges are

elected by the people.

History. Champlain and his followers, who made an expedition up the lake that now bears his name, in 1609, were the first white men to enter the state. French trading posts were established along Lake Champlain some years later and in 1690 an English settlement was made at Chimney Point, but the first permanent white settlement was not made until 1764, when colonists from Massachusetts settled at Fort Dummer in the present town of Brattleboro. During the French and Indian Wars the valley of Lake Champlain was a thoroughfare for hostile expeditions between warring nations and the hostilities of the French and Indians retarded the extension of settlements northward.

The territory was claimed by both New York and New Hampshire because of conflicting boundaries of grants of land made the English. Finally what is now known as Vermont acquired the name of New Hampshire Grants. Previously to the Revolutionary War settlements had penetrated the new territory as far north as Burlington and other points along Lake Champlain. These settlers resisted the claims of New York but they were loyal to the Colonies and rendered the country valuable service in keeping the British and Indians on the north from invading Massachusetts and other colonies to the south. The Battle of Bennington was the beginning of the chain of disasters which led to the surrender of Burgoyne at Saratoga in 1777.

Rejecting the claims of both New Hampshire and New York, the territory of Vermont with its present boundaries existed as a dependent state for fourteen years. It was recognized by Congress on March 4, 1791, and admitted into the Union as the fourteenth state, being the first state admitted after the adoption of the Constitution.

The state rendered heroic services during the Civil War and in the World War supplied 15,000 men to the army and navy, over one-half of those being sent overseas.

President Chester A. Arthur, Vice Presidents Levi P. Morton, William A. Wheeler and Calvin Coolidge, Admiral Dewey, Captain Charles E. Clarke of the *Oregon,* Justin Morrill, George F. Edmonds and Ambassador George Harvey are among the eminent men which Vermont has furnished the nation.

Statistics. The following are the latest reliable statistics available:

Land area, square miles	9,124
Water area, square miles	440
Forest area, acres	3,000,000
Population (1920)	352,428
White	351,817
Negro	572
Foreign born	44,526
Chief Cities:	
Burlington	22,779
Rutland	14,954
Barre	10,008
Number of counties	14
Members of state senate	30
Members of house of representatives	246
Salary of governor	$3,000
Representatives in Congress	4
Assessed valuation of property	$260,894,393
Farm area, acres	4,233,811
Improved land, acres	1,691,595
Corn, bushels	4,510,000
Oats, bushels	2,673,000
Potatoes, bushels	3,750,000
Barley, bushels	200 000
Wheat, bushels	126 003
Hay, tons	945,000
Wool, pounds	976,000
Domestic Animals:	
Horses	84,000
Milk cows	275,000
Other cattle	186,000
Sheep	91,000
Swine	105,000
Manufacturing establishments	1,790
Capital invested	$134,314,391
Operatives	33,491
Raw material used	$95,172,581
Output of manufactures	$168,108,072
Miles of railway	1,081
Teachers in public schools	2,935
Pupils enrolled	61,797

Verne, vĕrn, **Jules** (1828-1905), a French novelist. He was born at Nantes, February 8, 1828. He died at Amiens, March 24, 1905. He was educated for the law, but turned his attention to writing. He originated a new style of novel. Each story deals with a scientific invention which he surrounds with a wealth of imagination and adventure. His first story of this sort, *Five Weeks in a Balloon,* appeared in 1863. Others are *Twenty Thousand Leagues Under the Sea, Around the World in Eighty Days, The Mysterious Island, A Trip to the Moon, A Journey to the Center of the Earth, The Purchase of the North Pole,* etc. They have been translated widely into near-

ly all modern languages. Boys delight in Verne's stories. Learned men have found fault because they do not deal with scientific facts. Several of the creations of his imagination, however, as the submarine boat, the automobile, and the dirigible balloon, have been realized. Publishers usually compensate authors by paying what is known as a royalty, a percentage or share of the receipts arising from the sale of the books. Verne, however, wrote for forty years on a salary of 20,000 francs, about $4,000 a year. By the terms of his contract, he wrote a story each six months. He was so modest that his immediate neighbors in the town of Amiens did not know that he was a man of world-wide reputation. They, however, made him an alderman of his ward, and regarded him with the kindliest affection.

Vernon, British Columbia, capital of the Okanagan District, is near Okanagan Lake and on a Canadian Pacific branch railroad, 105 miles north of Penticton and 46 miles south of Sicamous. The city is the commercial center for a large fruit raising district, and the central fruit selling agency for Okanagan Valley is here. The manufactories of Vernon produce canned fruit, cider, pickles, sash and doors, bricks, lumber and alcoholic beverages.

Vernon has two parks, graded and high schools, private schools, a drill hall, a library, court house, custom house, seven churches and good hotels. Incorporated as a city in 1892, Vernon had 2,671 inhabitants in 1911 and 3,600 in 1921.

Verona, a city of northern Italy. It is situated on both sides of the Adige where that swift stream emerges from the foothills of the Alps and enters the plain of Lombardy. Verona is about seventy miles west from Venice by rail. It is a modern city with electric railways and electric lights. There are many manufactures of woolens, silks, and hats, and a considerable trade with the surrounding country. Interest in Verona is chiefly historical. The city is still surrounded by a lofty wall defended by towers and bastions. This wall is pierced by five gates noted for their strength and beauty. There are half a hundred churches, including magnificent specimens of Gothic architecture and containing priceless paintings and other treasures. The cathedral was built before the discovery of America. There are numerous palaces and a fairly preserved amphitheater capable of seating 27,000 spectators. Verona was founded at an early date, and was occupied by the Romans 200 years before the birth of Christ. Theodoric, the Goth, made it his capital. In 744 Verona was captured by Charlemagne and was an important city for a century or two. In his *Romeo and Juliet* Shakespeare pictures the distracted condition of the city under the rule of the nobles. In 1405 Verona became subject to Venice. In 1797 it was occupied by the Austrians, who held the city until it was incorporated in United Italy in 1866. The present population is about 86,448.

Veronese, vā′rō-nā′zā, **Paul, or Paolo Cagliari,** (about 1530-1588), an Italian painter. He was born in Verona, studied in Verona and Rome, then established his home in Venice. When he was twenty-eight he painted the pictures in the church of St. Sebastian at Venice, *The Baptism of Christ* and the *Martyrdom of St. Sebastian,* and became recognized as the rival of Tintoretto and Titian. He also painted the ceiling of the library of St. Mark. His *Marriage at Cana,* now in the Louvre, is considered his masterpiece. Other paintings are *The Annunciation, The Adoration of the Magi, The Family of Darius at the Feet of Alexander,* and *Venice, Queen of the Sea.* His work is characterized by spontaneity, fertile imagination, brilliant yet natural coloring, and, in the accessories of portrait painting, a disregard of history.

Verrazano, (1840-1527), an Italian navigator. He was born near Florence. He was educated in the oriental trade. The details of his life are not clear; but about 1505 he entered the service of France. He was employed as a privateer.

Versailles, vĕr-sä′yah, French town and royal residence ten miles southwest of Paris having in 1921 a population of 64,753. A highroad, two railways, and a tramway connect it with the city. Versailles owed its origin to Louis XIV. He built a palace and laid out a park here at the enormous expense of $200,000,000. The site is en-

tirely artificial. Thirty-six thousand men and 6,000 horses are said to have been employed in building terraces, leveling the park, and building a road from Paris. The palace itself fronts Paris. The façade is a quarter of a mile in length and three stories in height. The rear is provided with wide verandas and magnificent colonnades. It presents a more imposing view than the front. The bedchamber of Louis XIV with its original features, the chamber in which Louis XV died, the balcony from which, on the death of a king, the chamberlain was wont to break his wand of office and exclaim, "The king is dead," and taking another, exclaim, "Long live the king!" the apartments and furniture of Marie Antoinette, and many other features of interest are shown the visitor.

Terraced gardens, a four-armed lake, and smooth sward stretch away for two miles in the rear, forming the most extensive artificial park in the world. There are numerous basins containing groups of statuary designed to spout jets of water on occasion. The giant Enceladus, half buried beneath Etna, sends out a jet of water seventy-four feet high. One fountain has twenty-two groups of three metal children each, supporting goblets from which the water descends into basins. During the summer season the fountains play at stated times, usually the first Sunday of each month. A supply of water for a display costs about $2,000. At such times seemingly half of Paris goes out to see the exhibition. The Grand Trianon, about half a mile northwest of the palace, is a handsome villa erected by Louis XIV for Madame de Maintenon. She declared that the main palace was all for show—nothing for comfort or use. The Trianon contains a large collection of vases. The Little Trianon, also a handsome villa, was erected by Louis XV for Madame Du Barry. It was a favorite resort of Marie Antoinette, who, with her maids, delighted to play at dairying and making cheese and butter. After expending five millions in restoration, Versailles was abandoned as a royal residence by Louis Philippe. He converted the greater part of the building into a historical and art museum. The history of France from the day of Charlemagne may be traced in painting and sculpture. There are pictures representing the noted events in the reign of each sovereign; Charlemagne, Louis XIV, and Napoleon figure largely.

The palace and gardens cost so much money and the state in which the royal family lived there was so in contrast with the misery of Paris that Versailles may be regarded as one of the immediate causes of the French Revolution. In 1789 the starving women of Paris marched in a body to Versailles and forced the unfortunate king, Louis XVI, to return with them to the city. Versailles was occupied by the German troops during the siege of Paris. A large part of the palace was used as a military hospital. The pictures, however, were covered carefully to protect them from injury. After the departure of the troops Versailles was for a time the seat of the French government. The surrender of Paris and the treaty of peace were arranged here. The princes of the German Empire assembled in the great Hall of Mirrors in the palace to establish the new German Empire and to hail William I as their emperor. The treaty of peace between Great Britain and the United States was signed at Versailles in 1783. Here also the Treaty of Versailles, concluding the World War, was signatured June 28, 1919.

Versailles, Treaty of. The Treaty between the Allied and Associated Powers, of one part and Germany of the other part, adopted and signed at Versailles, France, June 28, 1919. The Associated Powers included United States, British Empire, France, Italy and Japan recognized in the Treaty as the principal Allied and Associated Powers, and twenty-three other powers, among which were Belgium, Brazil and China.

The Treaty became effective between the contracting parties when ratified by Germany and three of the Allied and Associated Powers ratifying it, and between Germany and other powers when either of said powers ratified it. Great Britain, France, Italy and Japan ratified the treaty at once, but ratification failed in the United States because strenuous objections to Part I, the Covenant of the League of Nations were raised in the Senate. The people were

divided on the issue, but the majority sustained the objections.

GERMANY'S LOSS OF TERRITORY. Germany was required to cede to other nations territory as follows:

To Belgium, the districts of Eupen and Malmedy, between Holland and Luxembourg, 382 square miles.

To France, Alsace-Lorraine, 5,600 square miles.

To Poland, part of Silesia and most of West Prussia and Posen, 27,886 square miles.

To the League of Nations the internationalized area around Danzig and the mouth of the Memel River, 729 square miles, the basin of the Saar, internationalized temporarily, 738 square miles. France was given the right to use the output of the Saar coal mines for fifteen years. A vote of the people is then to be taken to determine whether the Saar valley shall remain French territory or be ceded to Germany.

The disposal of the following territory was to be determined by the vote of the people. Northern Schleswig, 2,787 square miles; Upper Silesia, Southeastern third of East Prussia and districts along the North Vistula River, 5,785 square miles.

The total territory ceded by Germany is a little over 40,000 square miles.

German colonial possessions were placed under control of other nations:

In *Africa,* Togoland and Kamerun: future to be determined by the League of Nations.

German East Africa, under the mandate of Great Britain.

German Southwest Africa, under the mandate of the Union of South Africa.

Islands. German Samoan Islands, under the mandate of New Zealand.

Caroline, Marshall and Ladrone Islands, under the mandate of Japan.

New Guinea, under the mandate of Australia.

Total area about 1,140,000 square miles.

China. The Chinese Concessions, Kaiochau and the Shantung Peninsula, were placed under the control of Japan.

POLITICAL CONDITIONS. Germany was required to acknowledge the independence of German Austria, of the new states Czecho-Slovakia, Poland and Jugo-Slavia and of those states that had been formed or might be formed from parts of the former Russian Empire; the French control of Morocco and the British Protectorate of Egypt, and to set Luxembourg free from the German customs-union. Although not a member of the League of Nations, Germany was required to recognize the principles of that Covenant as set forth in Part I of the Treaty. Germany also agreed to abide by any treaties to be made by the Allied and Associated Powers with the Powers allied with her in the War.

MILITARY AND NAVAL CONDITIONS. Germany was required to reduce her army to 200,000; to release most of her navy and merchant marine; to relinquish control of the Kiel Canal and of the Rhine and other important rivers; to destroy the fortifications, harbors and military establishments on the islands of Helgoland and Dune and to agree not to reconstruct these works or any similar works on those islands in the future. Germany was also required to destroy all fortified works and fortifications in all Germany territory west of a line fifty kilometers east of the Rhine.
accept responsibility for the war and for all the loss and damage caused by it, and to promise that she would make compensation to the civilian population of the Allied and Associated Powers, the amount of this compensation to be determined by an Inter-Allied Commission. (The estimated amount of these damages exceeded twenty-five billion dollars).

See LEAGUE OF NATIONS.

Verse. See POETRY.

Verst, a Russian measure of length. The term is akin to verse, meaning a turn. The verst is the measure of distances. It is equivalent to 3,500 English feet, nearly two-thirds of a mile.

Vertigo, a dizziness or giddiness in which the individual or the objects around the patient appear to be whirling about. The term is from the French, meaning a whirling. Scientists are pleased to say that when the patient seems to be himself whirling he has subjective vertigo, and objective vertigo when the surrounding objects seem to whirl. A very real imitation may be brought on by whirling rapidly until dizzy. Genuine vertigo may result from disorders of the heart or stomach or from a defect of the eye. Bright's disease is accompanied not infrequently by vertigo. Certain drugs, as hemp, opium, belladonna, nicotin, and digitalis, may bring on vertigo. The treatment for this affliction consists chiefly in ascertaining and removing the cause.

Vesta, in Roman mythology, the goddess of the hearth. A sacred fire was kept burning on her altar at the foot of the Palatine Hill. If by any mischance it went out it was rekindled with the rays of the sun. Four priestesses of Vesta, later six, were known as vestals or vestal virgins. They had charge of the temple, the sacred fire, and the ceremonies connected with her worship. The position of a vestal was one of great honor. The vestals were given the choicest seats at the games and were regarded as beings of spotless purity. Daughters of noble families sought the honor. They served for thirty years, ten years to learn the duties of the temple, ten to perform them, and ten to teach them to their successors. At the end of the thirty years a vestal was free to return to her father's house and even to marry if she chose. The fall of a vestal from virtue was regarded as the most shocking of crimes and was punished with death by stoning or burial alive. The Roman vestals may be regarded as an early order of nuns. The Greek name of Vesta was Hestia.

Vestal Virgins. See VESTA.

Vesuvius, a noted volcano. It is situated near the east shore of the Bay of Naples, about ten miles from the city of that name. It is the best known volcano in the world. It stands alone in the plain. It has a conical shape and is about 4,000 feet high. Prior to 79 it was not active. Its slopes and even its whole crater were covered with vineyards. In that year, however, a tremendous eruption of volcanic dust, stones, and pumice took place, overwhelming the cities of Herculaneum and Pompeii at the foot. The elder Pliny, who commanded the Roman fleet in that vicinity, sailed near to aid the inhabitants, and was suffocated by fumes of sulphur. No less than sixty considerable explosions and many small ones have taken place since. At times it has been feared that the entire mountain would fall in. In 472 ashes from Vesuvius were wafted as far as Constantinople. In 1779 enormous masses of rock were thrown out. One block is said to be 108 feet in circumference. In 1822 three-fourths of the crater was broken off, but it was built up by subsequent eruptions. Eruptions occurred in 1904 and 1906. Vesuvius is the most visited of all volcanoes. During times of comparative rest it is reached from Naples. The ascent is rendered easy by a combination of rack-and-pinion and cable road that leads almost to the top. Tourists are guided to the summit and even to a considerable depth within the crater. See PLINY; POMPEII; VOLCANO; ETNA; STROMBOLI.

Vetch, věch, a name given to several species of leguminous herbs. The vetches are closely allied to the peas. The common field vetch is raised for a green fodder crop. It is a native of Europe. The broad Windsor bean is also a genuine vetch. A delicate climbing vetch with bluish flowers may be found in the moist soil of prairie and copse edges. It is one of the flowers of early summer, beginning to bloom in June in the Northern States. See LENTIL; PEA.

Veto, in Roman history, authority given to the tribunes of the people to reject an act of the Senate by saying *veto*—I forbid. Under a constitutional form of government, a similar power of veto is vested in the king, president, or governor. In practice, the veto power varies. The autocrat of all the Russians, who vouchsafed his people a constitution, 1905-7, not only reserved the right to veto bills, but he forbade the reconsideration of a vetoed bill during the current session of the Duma. The Prussian monarch held the power of veto and exercised it; the monarch of Sweden holds the power of absolute veto; the Swiss people have adopted the very sensible plan of retaining the veto power in the hands of the voters. No legislative act of importance may go into effect until opportunity has been given the people, if a small percentage signify such a desire, to pass on it by a referendum vote. To all intents and purposes the king of Italy has lost the veto power. In Spain and Portugal the monarch may interpose a "suspension veto," but if a second legislature, freshly elected, pass the same measure, the royal veto becomes null and void. Only a majority is required. In Great Britain the sovereign's power to reject an obnoxious bill has not been exercised since 1707, and has ceased to be a constitutional function. The House of Lords is relied upon to place any needed check upon the House of Commons; but a

minister supported by a reëlection of his party in the House of Commons, can easily bring the lords to terms.

In the United States the president may veto a bill by returning it to the house where it originated, giving his reasons for declining to sign. His veto may be overcome by a two-thirds vote of the House and a similar vote in the Senate. The president is allowed ten days, Sundays not counted, in which to sign or veto a law. In case he retains the bill over ten days without taking action it goes into effect without his signature. Buchanan was the first to allow a bill to go into effect in this manner. In case Congress adjourns before the ten days are up, a refusal to sign is the end of the matter. If an objectionable bill be passed during the last ten days of the session the president may evidently allow it to lie unsigned and become of no effect without giving a reason. Such a course is termed a pocket veto. Jackson was the first president to use this form of veto. On the whole, American presidents have used the power of veto with care. Washington vetoed but two bills in eight years. Jefferson never vetoed a bill. There were in all but nine presidential vetoes prior to Jackson, who vetoed twelve bills. Grant vetoed forty-three bills; Johnson, twenty-one. Cleveland vetoed more bills than all his predecessors. He refused his assent to 301 bills during his first term. Most of these were private pension bills relating to cases that in his judgment should have been allowed to take their regular course through the pension bureau. The first bill passed over a veto was a tariff measure vetoed by President Tyler.

The veto power was a source of contention in colonial days. One of the grievances against the king stated in the Declaration of Independence runs, "He has refused his assent to laws, the most wholesome and necessary for the public good." The modified veto, according to which the legislative body may pass a bill over a veto by a two-thirds vote, appeared first in the Revolutionary Constitution of New York adopted in 1777, and later in that of Massachusetts adopted in 1780. The wording of Massachusetts was followed closely in the national Constitution with the addition of the provision for the pocket veto. Franklin was nevertheless in favor of vesting the veto power in the president. He was of the opinion that one person as an executive was, in a way, more subject to public opinion than a body of legislators. "A single man," said he, "may be afraid or ashamed of doing injustice; a body is never either one or the other, if it is strong enough. It can not apprehend assassination, and by dividing the shame among them, it is so little apiece that no one minds it." The governor of a state is vested with the veto power relative to state legislation. The mayor of a city is authorized usually to veto measures passed by the city council.

CANADA. In accordance with the provisions of the British North America Act the Canadian Governor-General must send to the Secretary of State for the Colonies, at London, copies of all laws enacted by the Dominion Parliament. If these laws are found to conflict with the interests of the Empire they may be vetoed at any time within two years of their receipt in London. The Governor-General has the right to withhold his approval of any measure enacted by Parliament, but must at once send them to the Secretary of State for the Colonies with his reasons for refusing his assent.

Vicar, in ecclesiastical history, a substitute or delegate. The pope is called the vicar of Christ on earth. In the Church of England, the vicar is the substitute employed by one who holds a living, that is to say, who enjoys the revenue of a parish, to discharge the duties of a pastor. The rector is entitled to the use of the parsonage and the revenues of the parish, but a vicar labors for such compensation as may be agreed upon.

Vicar of Wakefield, The, a novel by Oliver Goldsmith published in 1766. Its chief characters is Dr. Primrose, the vicar, and the story is the simple tale of his family and home life. By 1886 the book had gone through ninety-six editions. See GOLDSMITH.

Vice-President, in the government of the United States, the second executive officer of the nation. The vice-president is chosen by the electoral college in the same manner as the president for a term of four

years. He receives a salary of $12,000 per year. By provision of the Constitution he is the presiding officer of the senate; but has no vote except in case of a tie. The vice-president may be removed by impeachment. In case of the "removal of the president from office or of his death, resignation or inability to discharge the powers and duties of the said office, the same shall devolve on the vice-president."

The Constitution provided originally that each elector shall vote for two candidates for the presidency, and that the candidate having the greatest number of votes shall be the president, the person having the next greatest number of votes to be vice-president. Vice-Presidents Adams and Jefferson were chosen in this way. In 1800 an ugly tie for the presidency occurred. Thomas Jefferson and Aaron Burr had the same number of votes, and the election of president, as well as vice-president, was thrown into the House of Representatives as provided. To prevent such a state of affairs in future, the twelfth amendment of the Constitution was proposed and adopted. It provides that, in balloting, the elector shall name one candidate for the presidency and another for the vice-presidency.

It is noticeable that with the exception of Adams and Jefferson, who were elected under the old system, Martin Van Buren was the only vice-president who was ever nominated by his party and promoted to the presidency. Roosevelt is not an exception. He first became president by the death of McKinley. In fact, the vice-presidency has never been considered a position comparable to that of the presidency. In the early days of the republic the vice-president was known jokingly as "his superfluous excellency."

In 1841, on the death of President W. H. Harrison, Vice-President John Tyler took the oath of office and assumed the duties of president. Millard Fillmore, Andrew Johnson, Chester A. Arthur, and Theodore Roosevelt became presidents in the same way. John Adams, George Clinton, and John C. Calhoun served two terms each. Of late, vice-presidents have not been reëlected, though Thomas W. Marshall has constituted an exception to this rule.

Vichy, a town in the picturesque valley of Allier, France. Vichy was originally a Roman camp. It is now noted for warm springs, the waters of which have a temperature of from 59° to 106° F. Vichy water is charged with bicarbonate of soda. Vichy is the resort of persons afflicted with gout, rheumatism, diabetes, etc. Large hotels accommodate, it is said, 60,000 guests yearly.

Vicksburg, the third city of Mississippi and the county seat of Warren County, is on the Mississippi River and on the Alabama & Vicksburg, Yazoo & Mississippi Valley and Vicksburg, Shreveport & Pacific railroads, 234 miles by rail north and west of New Orleans. The city has an attractive location in the Walnut Hills and overlooks the river from a high bluff.

Vicksburg ranks high as a commercial center, trading extensively in cotton, lumber and other commodities. From the manufactories come cotton-seed oil and cake, molasses, lumber, furniture, wagons, boat oars, iron ware, boilers and foundry and machine shop products.

Here are located St. Francis Xavier Academy, All Saints College and St. Aloysius College, and there are good public schools and a library. The National Cemetery and Vicksburg National Military Park are very attractive spots; the latter is 1,300 acres in extent.

Vicksburg was founded in 1811 on the plantation of William Vick and John Lane, and was incorporated in 1840. In 1861 it was fortified, but was forced to surrender to Grant in 1863. Population, 1920, 18,072.

Victor Emanuel II (1820-1878), the creator of modern Italy, was the son of Charles Albert, King of Sardinia, whom he succeeded in 1849. Albert had granted his people a constitution and instituted other reforms, but becoming involved with Austria, he abdicated in favor of his son, whom he thought could secure better terms from that country. Victor Emanuel surrounded himself with able statesmen and advanced the industrial and commercial interests of his kingdom. He retained the constitution despite Austria's strong opposition; he reorganized the army, and secularized church property.

Assisted by Cavour. Victor Emanuel be-

came the leader in the movement for a United Italy. Sardinia participated in the Crimean War and thereby gained recognition by European nations. Then by wars and plebisites, Lombardy and Naples, with Sicily and Venetia were added to Sardinia. In 1861 the Kingdom of Italy was proclaimed with Victor Emanuel as its first king. The Papal States were added in 1870 and the capital was removed to Rome. Throughout his reign Victor Emanuel gave special attention to improving the country and the conditions of the people. He also displayed a high order of statesmanship in his dealings with other nations. See CAVOUR: GARIBALDI.

Victor Emanuel III (1869—), King of Italy. He is the only son of King Humbert I and Queen Margharita. At the age of 18 he entered the army, where he steadily advanced in rank, and was generally known as Prince of Naples. In 1896 he married Princess Helena of Montenegro, and the same year represented his father at the coronation of Czar Nicholas II, of Russia. In 1897, he rendered like service at Victoria's jubilee. When his father was assassinated in 1900, he ascended the throne. Victor Emanuel is a democratic king and a just and liberal ruler. In his efforts to benefit his people he has been greatly assisted by the Queen. There are three children, Princesses Yolanda and Marraida and Prince Humbert.

When Italy entered the Great War, the King went to the front with his armies and remained in the field, sharing the hardships and dangers with the soldiers.

Victoria, Alexandrina (1819-1901), queen of Great Britain and Ireland. She was born at Kensington Palace, London, May 24, 1819, and died at Osborne, Isle of Wight, January 22, 1901. She was the only child of Edward, Duke of Kent, fourth son of George III. Her mother was the daughter of the duke of Saxe-Coburg. Her father died when she was but eight months old. The Duchess of Kent brought Victoria up sensibly, giving her the best of training in music and literature. Princess Victoria was fond of modern languages and of botany. Her grandfather, George III, left his crown to his son, George IV. On the death of the latter without children the crown passed to his brother, William IV. He died without children. Victoria's father, the next in succession, being dead, Victoria fell heir to the crown of Great Britain and Ireland. She was proclaimed queen June 21, 1837, and was crowned at Westminster June 28, 1838.

The policy of her government was shaped by such statesmen as Melbourne, Peel, Russell, Derby, Aberdeen, Palmerston, Gladstone, and Disraeli. Victoria herself abstained from taking sides in politics. In early life, under the influence of Melbourne, however, she was known to be a Whig, if not a Radical. In later years, with the caution common to old age, she became Conservative in her thinking and leaned decidedly to Disraeli in preference to Mr. Gladstone.

February 10, 1840, Queen Victoria was wedded to her cousin, Prince Albert, of the house of Saxe-Coburg and Gotha. The queen's mother, to whom she owed much, died March 16, 1861. On December fourteenth of the same year, the Prince Consort, as he was termed, died. He was buried in the royal mausoleum at Frogmore near Windsor.

In 1876 Disraeli procured the passage of a bill conferring the title of Empress of India upon Queen Victoria. This pleased her. After the death of Albert, however, the Queen took as little part as possible in social functions. Her regular home was at Windsor Castle. Her city residence was at Buckingham Palace. Her country homes were at Balmoral in the Highlands and at Osborne in the Isle of Wight. Queen Victoria and Prince Albert had nine children, four sons and five daughters.

Of the queen's children, all but the Duchess of Argyle bore her grandchildren. At the time of her death, the queen left six children, thirty-one grandchildren, and thirty-seven great-grandchildren. She lies by the side of her husband at Frogmore.

Queen Victoria was a woman of short stature and not particularly attractive features. She had an imperious will, but it was balanced by strong common sense. She was a woman of the utmost integrity. She left the management of state affairs largely to her cabinet, but she ruled her official household well. She possessed the virtues

of a British matron. She permitted no scandal in connection with her court. As a woman of character and uprightness, possessing an innate sense of justice, the British nation has reason to be proud of her. She was the best woman who ever sat on the British throne.

In 1868 she wrote a volume of personal reminiscences, entitled *Leaves from the Journal of Our Life in the Highlands,* and in 1883 she wrote *More Leaves.* She also supervised the publication of a life of her husband.

See WINDSOR; WIGHT; BALMORAL; ALBERT; GLADSTONE; DISRAELI; EDWARD VII; BUCKINGHAM.

Victoria, British Columbia, the capital and second city of the province, is on the southeastern end of Vancouver Island. It is the terminus of the Victoria & Sydney and Esquimalt & Nanaimo and Canadian National railroads, and is served by coast steamers and trans-Pacific boat lines. Victoria is 80 miles north of Seattle, Wash., and 85 miles southwest of Vancouver.

BUILDINGS, PARKS AND INSTITUTIONS. Victoria has grown rapidly in commercial and industrial importance, and many of its business blocks are modern in every detail. The parliament buildings and Canadian Pacific Railway's Empress Hotel are noteworthy.

The city contains many beautiful parks, but the Beacon Hill Park, facing the Strait of Juan de Fuca and affording a view of the Olympian Range, is the most attractive. Other interesting features are the Dominion Astrophysical Observatory and the Dominion Astronomical Observatory where is located one of the largest telescopes. The most conspicuous churches are St. Andrew's Cathedral, and St. John's Anglican Cathedral, Metropolitan Methodist, St. Andrew's, First Presbyterian, Christian Science Temple, etc.

Among educational institutions are the Provincial Normal School, Victoria College, high school, Sprott-Shaw Commercial and several excellent private schools. The Provincial Royal Jubilee Hospital and the St. Joseph's Hospital are well appointed in every respect.

COMMERCE AND INDUSTRY. Victoria has a commodious natural harbor that is open all year and contains, besides ample wharfage and storage space, a large dry dock and shipbuilding plants. Forest, mine, farm and fishery products are the principal items of trade.

The factories of the city are constantly increasing in number; they produce canned fish, paints, cement, bricks and tile, machinery, furniture, canned fruits and jams, boats, brass ware, soap, tents and awnings, and many other commodities.

HISTORY. In 1846 a post of the Hudson's Bay Company was erected where Victoria now stands. A town was laid out in 1852, and after the discovery of gold on the British Columbia mainland six years later its growth increased. It secured a city charter in 1862 and became the provincial capital in 1868. In 1911 the population was 31,600, but this had increased to 50,000 by 1921.

Victoria, the smallest of the Australian states, is also the most densely settled, with 1,531,529 inhabitants in 1920. The area is 87,884 square miles. Victoria is bounded by New South Wales, north; the Pacific Ocean, east and south; and South Australia, west; and thus occupies the extreme southeastern corner of the continent. Melbourne is the capital of Victoria and the temporary capital of the Commonwealth; the inhabitants of the city numbered 103,269 in 1920. Hamilton, Bendigo, Maryborough, Mildura and Stalwell are also important cities.

SURFACE AND DRAINAGE. In eastern Victoria are the mountain ranges known as the Australian Alps and containing Mount Begong, the highest point in the state, 6,508 feet. These ranges are for the most part forested with eucalyptus trees. The remainder of the state is a broad, undulating plateau, decreasing in height above sea level toward the southern coast. The coast is about 800 miles long and is very irregular; the largest indentation, Port Phillips Bay, is one of the finest landlocked harbors in the world. The Murray River, which separates Victoria from New South Wales, is the principal stream. The climate is in general warm and healthful; freezing weather is almost unknown, but extremes of heat often occur in summer.

INDUSTRY AND COMMERCE. Agriculture and mining, in that order, are the leading

industries. At the end of 1920 there were 4,850,000 acres of agricultural and 8,500,000 acres of pastoral land. Wheat is the most valuable crop, the 1921 yield being 39,469,000 bushels. Oats, barley, hay, potatoes, grapes and orchard fruits are grown in large quantities. Since 1910 the acreage given to sugar beets has steadily increased. In 1921 there were 487,503 horses, 1,575,000 cattle, 12,171,000 sheep and 175,000 swine in the state. In 1920 the wool clip weighed 132,847 pounds. Dairy products have become important in Victoria's commerce.

Gold is the most important mineral, the mines yielding 152,792 fine ounces in 1920. In the same year 442,241 tons of coal, 162,682 tons of brown coal and 3,393 tons of gypsum were mined. Other minerals that occur in paying quantities are silver, tin, kaolin, fluorspar, phosphate rock, wolfram, antimony, pigment clay and molybdenite.

New South Wales has exceeded Victoria as a manufacturing state, but the latter had 6,038 plants in 1920. These were valued at about $155,000,000 and produced approximately $507,000,000 worth of goods.

Education. Victoria has a splendid educational system, comprising registered schools, technical schools, state primary and secondary schools and the university. Primary education is free and compulsory and is strictly secular. The University of Victoria, maintaining the School of Mines at Ballarat, is the highest institution; affiliated with it are colleges maintained by the Anglican, Methodist, Roman Catholic and Presbyterian churches.

Government and History. The highest executive is appointed by the crown, but the legislature is elected. The upper house has 34 and the lower house 65 members, all elected for three years. Suffrage is universal.

A settlement was made in Victoria in 1834 and in 1835 was incorporated with New South Wales. Gold was discovered before the middle of the century and settlers came in large numbers. Before the close of the nineteenth century the political and economic importance of the state was assured.

Victoria Falls. See Zambezi River.

Victoria Nyanza. See Nyanza; Uganda; Africa; Nile.

Victoria Regia. See Water Lily.

Victoriaville, Quebec, is on the Canadian National Railway, 65 miles southwest of Quebec; there is also a branch of this road to Three Rivers, 42 miles distant. Hydro-electric power is available, and from the industrial establishments of the city issue furniture of all grades, chairs, rattan chairs, maple sugar and syrup, fertilizer, clothing, foundry products, sash and door, cement, flour, grain, perfumes, lumber of every description, machine shop products, builders' supplies, mica, woolen goods, mattresses and cheese.

Victoriaville has a Roman Catholic church, colleges, convent and two academies, for boys and girls. In 1922 the population was 4,800.

Vicuña, vē-kōōn′yä, a South American animal. It is related closely to the llama and the alpaca, but it is smaller and more graceful. It stands about thirty inches high at the shoulder. It runs wild in the mountains of Bolivia and Chili. Its flesh compares favorably with venison. Its fleece is valuable in the making of the finer sorts of cloth, known as alpaca. Unlike the camel, the vicuña pines away when subjected to confinement. It is useless for carrying burdens. See Llama; Alpaca.

Vienna, vē-ĕn′a, the capital of the former Austrian Empire, and now of the Republic of Austria. It is situated near the right bank of the Danube, on what is known as the Danube Canal. The core of Vienna is what is known as the "Inner City." It is surrounded by a wide boulevard occupying the site of an early defensive wall and ditch.

The Church of St. Stephen is the most important edifice in the city. It is one of the great churches of Christendom. The building is of solid limestone and has the form of a Latin cross. Although fragments are of older date it may be said to have been erected between 1300 and 1510. It is 354 feet in length. The nave is thirty-four feet wide and eighty-nine feet high. The side aisles are twenty-seven feet wide. It is not lighted through the clerestory. The

vaulting is groined richly and is supported by eighteen pillars adorned by a hundred statues. The tower of St. Stephen's is 453 feet high and commands an extensive view of the city, its suburbs, and the winding Danube. A number of battlefields are in view.

There are several markets and other open places adorned with statues of famous men. The most noted is the bronze monument of Emperor Francis I. The old Austrian palace, the home of Austrian princes since the thirteenth century, contains priceless art collections. The Imperial Library is richly decorated with gilding, paintings, and marble. It shelters over 400,000 volumes, 20,000 manuscripts, 12,000 volumes of music, and 300,000 engravings and woodcuts. A mineral cabinet contains specimens of minerals, stalactites, rock salt, crystals, emeralds, opals, and other precious stones from all parts of the known world. A fine collection of meteorites is to be seen here. This Inner City was for centuries the capital of Germany. It was the successor of Aix-la-Chapelle. It is not surprising, therefore, that the imperial treasury, a department of this same palace, should contain the richest collection of apparel and jewelry to be seen in Europe. There are heralds' robes, jeweled caskets, crystal goblets set with diamonds, precious stones, vases, drinking cups, and tankards in profusion. The private jewels of a long line of Austrian rulers are kept here. One diamond, set in a hat clasp, weighs 133 carats and is valued at a quarter of a million dollars. A decoration of the Golden Fleece contains 150 brilliants. A scarf is adorned with 548 diamonds. There are magnificent tiaras and necklaces ornamented with rubies and emeralds. Among the priceless relics brought to Vienna from Aix-la-Chapelle are the crown, the sceptor, the globe, the girdle, the coronation robe, and the sword of Charlemagne. All these and many other relics are shown to visitors freely, but guards stand by all the time to see that no act of vandalism is perpetrated. A mere enumeration of the museums and collections in Vienna would occupy pages.

Vienna is one of the most attractively built cities in the world. There are palaces innumerable. The best streets are lined with attractive shops and cafés. The residence sections are occupied by attractive, many storied, we may say almost palatial, dwelling houses of the type known in the western world as flats. The university, founded in 1237 and reorganized by Maria Theresa, occupies handsome quarters. It had 400 professors and over 10,500 students in 1920. They have access to the museums already mentioned and to a university library of 320,000 volumes.

In a business way Vienna was the most important manufacturing town in the empire. Vienna specialties are leather, porcelain, musical instruments, firearms, hardware, and cotton and silk goods. The city is the center of numerous railway lines and is in communication by river and canal with all Europe. Water is brought to the city from the Alps. By drawing away a large Czech element together with other foreigners, the World War had the effect of decreasing the population of Vienna from 2,030,580 in 1910 to 1,841,326 in 1920. See AUSTRIA; HUNGARY; BUDAPEST; DANUBE; WAR, THE GREAT.

Vienna, Congress of, the council of powers that met at Vienna in 1814 to reädjust the map of Europe. Following the banishment of Napoleon to Elba and the restoration of Louis XVIII to the throne of France, it became necessary to reörganize the territory and governments of Europe. To that end a congress of all the powers convened at Vienna in November, 1814. The principal members of the Congress were Metternich, prime minister of Austria, who presided over the meetings, Alexander, czar of Russia, Hardenberg of Prussia, Castlereagh of England, and Talleyrand of France. Stein was present from Prussia, but in an unofficial capacity. The Allies—Austria, England, Prussia, and Russia—from the first reserved to themselves the right of deciding all territorial questions. Later Talleyrand secured entrance to their councils, and played off one combination against another, securing by this method terms advantageous to France. The representatives of the smaller states were obliged to be content with the territorial dispositions allowed them by the Allies.

The work done was of utmost importance.

Although interrupted by the return of Napoleon and the Hundred Days, their negotiations were finally concluded in 1815. France was deprived of the Netherlands, but was allowed to keep her boundaries of 1792. Russia acquired the lion's share of Poland; Prussia obtained Posen; West Prussia, half of the kingdom of Saxony, and the west Rhenish provinces; Austria received Venetia, Lombardy, and the Tyrol to compensate her for her loss of Belgium; in Italy the former Hapsburg rulers were reëstablished, and Italy became again a "mere geographical expression." The king of Saxony was restored with his territory reduced by half, and Hanover was also made an independent kingdom. To punish Denmark for its support of Napoleon, Norway was taken away and given to Sweden, though Denmark received Swedish Pomerania. Belgium and Holland were made into the kingdom of the Netherlands with Holland in control. Switzerland was made independent and neutral. England received no territory on the continent, but her possession of Malta, Cape Colony, Ceylon, and other islands was confirmed. The German states were united into a weak confederation under the presidency of Austria. The one disinterested act of the Congress was the denunciation of the slave trade, a question which was then prominent in European affairs. A disposition on the part of the Congress to meddle in American affairs, led to the declaration of the principle known as "The Monroe Doctrine."

Vienna University. See VIENNA.

Vigilance Committee, in the United States, an organization of citizens to put down lawlessness. A vigilance committee differs entirely from a mob. In case crime becomes rampant and it is impossible to control the criminal class by ordinary process of law, an orderly assemblage of citizens and the formal selection of a public committee to enforce the law are considered a legitimate procedure. In the early days of San Francisco, for instance, thugs, thieves, gamblers, and other disreputable people, attracted by the mining camps, filled up the city and overrode the law. The police were terrorized. Citizens were shot down in the streets. No one's life or property was safe. Crime ran riot. In this emergency the bolder citizens convened and organized a committee known as the vigilantes. This committee went after the lawless element and made short, sharp work of the desperadoes. Murderers and other desperate characters were haled out of the saloons and resorts and were hung to the nearest tree or lamppost. Those who were not caught fled. Within a few days order was restored and the city resumed its usual aspect.

Vikings. See NORSEMEN.

Villa, Francisco [Pancho] (1877-1923), a Mexican outlaw and revolutionary general who, through his raids into the United States in 1916, brought the latter country and Mexico to the brink of war. He was born at Las Nieves, and his real name, before joining the Madero revolt, was Doroteo Arango. It is said that Villa became an outlaw and bandit at an early age after killing an official who had harmed his sister. A price was put upon the bandit's head by the Diaz government. When the resignation of Diaz was forced in 1910, Villa joined Madero, serving under Huerta. When the revolt against Huerta broke, Villa joined Carranza. Soon he turned against Carranza, and during 1915 the Carranza and Villa forces were continually at war. Villa is described as having been a cruel, crafty self-seeker, without a sense of loyalty, but at the same time a rather able and daring military leader. On March 8, 1916, the Villa forces raided the town of Columbus, N. M. President Wilson thereupon ordered troops to the Mexican border. The American forces penetrated several hundred miles into Mexico, but Villa evaded capture. After that time, though he continued his career in Mexico, the bandit did not venture into the United States. He was murdered in July, 1923.

Villon, François, a French poet. As nearly as can be ascertained he lived 1431-1484. The certainties are that he lived a wild, dissolute, Bohemian life and wrote exquisite poetry. Of unknown parentage, like enough his father may have been some nobleman, Villon was educated by a wealthy guardian, received the degree of master of arts, and had influential friends. He forfeited standing by getting into an affray

with a priest and killing him. Out of a jumble of affrays, imprisonments, pardons, escapes, banishments, forgeries, thefts, burglaries of chapels, and murders, we find him ever turning up in Paris, the associate of pickpockets, blackguards, and vagabonds. The lowest dives in Paris were his delight, the lowest barrooms rang with his songs. He was an expert in the slang of thieves. He led his companions to the treasure chest of the cathedral, yet clothed the highest sentiments in the most beautiful language known to man. He has been termed a gutter genius, an inspired blackguard, poet of the slums and all that; but it is admitted that his poetry ranks with the best that the world has produced. The wonder is that such poetic beauty and delicacy grew in social mire. Villon's career only goes to prove that real inspiration—original genius—springs from the soil, from the heart of the people,—not from the crust we are pleased to term society. Villon was educated in the Latin tongue of course; he wrote in French. On one occasion he secured his release from prison by addressing a poem to a princess of the royal household. At another time, while lying in jail, broken by torture, and under sentence of death, he excited commiseration and obtained release by writing a *Ballade du Pendu.* All in all, Villon merits the mantle of charity with which Shelley so skillfully covered his faults in his *Defense of Poetry.* "Let us assume that Homer was a drunkard, that Virgil was a flatterer, that Horace was a coward, that Tasso was a madman, that Lord Bacon was a peculator, that Raphael was a libertine, that Spenser was a poet laureate,—their errors have been weighed and found to have been dust in the balance; if their sins were scarlet, they are now white as snow; they have been washed in the blood of Time."

Vincennes, vĭn-sĕn′, a suburb of Paris with a population of 30,500 inhabitants. It forms an angle of the city fortifications. It lies eastward from the old Bastile on the side of the city opposite Versailles. From the twelfth century onward, Vincennes was a place of royal residence, a center of statecraft and fashion. In 1740 the chateau was converted into a porcelain factory. Later the factory was removed to Sèvres. In 1832 the chateau, with its lofty, massive walls, square keep, and deep moat, was converted into one of the defensive fortifications of Paris. The keep is a massive stone tower of five stories. The walls are ten feet thick. It was long used as a state prison. The king of Navarre, Condé, Mirabeau, and the Duc d'Enghien were held here. The latter was shot by order of Napoleon and was buried in the moat. His remains were later removed to the chapel. The chief attraction of Vincennes is a beautiful park of 2,250 acres. It is planted with trees and embellished with pathways, drives, sheets of water, islands, bridges, grottoes, etc. A part of the park is set aside as a drill ground for the garrison. The vicinity is historic and full of interest, but the village itself is prosaic. Vincennes people find employment in Paris or are engaged in manufacturing and in petty shopkeeping. See VERSAILLES.

Vincennes, Ind., an industrial city and the county seat of Knox County, is on the Wabash River and on several railroads, 117 miles southwest of Indianapolis. In the vicinity are deposits of oil, gas and coal. The chief manufactures are jewelry, paper, sewer pipe, stoves, window glass, furniture, buttons and structural steel. It is the seat of Vincennes University, the oldest institution of higher learning in the state. It has fine public schools, a library and parks and playgrounds.

Vincennes is said to be the oldest settlement in Indiana. In 1702, the French established a fort here on the site of a Piankasaw Indian village. A settlement grew up, and it was taken by the British in 1763. In 1779, Colonel Clark took it from the British in the name of Virginia, and in 1783 it was ceded to the United States. From 1801 to 1816, it was the capital of Indiana Territory. In 1920 the population was 17,210.

Vincent, George Edgar (1864-), an American educator and university president, since 1917 president of the Rockefeller Foundation. He was born at Rockford, Ill., and was graduated from Yale University in 1885. After spending a year in editorial work, Professor Vincent traveled in Europe and the Orient. In 1886 he was chosen editor of the Chautauqua Press, and

vice-president of the Chautauqua Literary and Scientific Circle, of which he was elected president in 1907. He was a fellow at Chicago University from 1892 to 1894; was appointed to the faculty in the latter year; and became professor of sociology there in 1904. For seven years after 1900, Professor Vincent was dean of the junior colleges, and from 1907 to 1911 was dean of the faculties of science, literature and arts. Professor Vincent was chosen president of the University of Minnesota in 1911, where he served until 1917; in the latter year he was made president of the Rockefeller Foundation. Among his published works are *Social Mind and Education* and *An Introduction to the Study of Society,* the latter with Albion W. Small.

Vincent, John Heyl (1832-1920), an American Methodist Episcopal bishop, one of the founders of the Chautauqua Assembly movement. Born at Tuscaloosa, Ala., Dr. Vincent began to preach at the age of 18. He studied at the Lewisburg, Pa., Academy and at Wesleyan Institute, Newark, N. J. He held several pastorates in the East, and in 1857 was transferred to the Rock River Conference, in Northern Illinois. He established the *Sunday School Quarterly* in 1865, and the *Sunday School Teacher* in 1866. In 1874, Dr. Vincent assisted in founding the Chautauqua Assembly, and from 1878 until 1900 was chancellor of the Greater Chautauqua movement. In 1888, he was elected bishop, with headquarters at Topeka, Kans., and in 1900 was appointed resident bishop in Europe, and stationed at Zurich, Switzerland. In 1904 he retired from the active work of the episcopate. George E. Vincent, a son of John Heyl Vincent, is president of the Rockefeller Foundation. Dr. Vincent is the author of *Studies in Young Life, The Chautauqua Movement, The Church School and Its Officers* and *Family Worship for Every Day in the Year.*

Vinci, Leonardo da, lā-o-när′do dä vin′chee (1425-1519), a noted Italian painter. He was born at the village of Vinci, between Piza and Florence. Leonardo's portraits and Madonnas are found in the leading galleries of Europe. His masterpiece, *The Last Supper,* was painted on the wall of the refectory, or dining room, of a convent in Milan. Christ and his disciples sit at table as described in Luke xxii. This enormous fresco, considered by many the greatest painting produced by Italy, suffered shameful treatment. In 1652 the Dominican monks, desiring to enlarge their doorway, cut off the legs of the figure of Christ and the nearest disciples. During the Napoleonic wars French Hussars used the refectory as a storeroom for horse fodder. Tourists, too, were at one time carelessly allowed to dig out bits of plaster and carry them away as souvenirs. Water stains and attempted patching have helped to ruin the picture, but for the last hundred years every effort has been made to preserve so great a work. Fortunately a large number of copies have been made, the best by an artist who devoted six years to the work. Leonardo's talent is summed up by saying that, in point of time, he taught Michelangelo force, Raphael beauty, and other artists grace. Leonardo was not only a great artist, but he was a leader in other departments of thought. See PAINTING.

His knowledge was almost preternatural.—Hallam.

Long before Bacon, he laid down the maxim that experience and observation must be the foundation of all reasoning in science; that experiment is the only interpreter of nature, and is essential to the ascertainment of laws. Unlike Bacon, who was ignorant of mathematics, and even disparaged them, he points out their supreme advantage. Seven years after the voyage of Columbus, this great man—great at once as an artist, mathematician, and engineer—gave a clear exposition of the theory of forces obliquely applied on a lever; a few years later he was well acquainted with the earth's annual motion. He knew the laws of friction and the principle of virtual velocities; he described the camera obscura, understood aerial perspective, the nature of colored shadows, the use of the iris, and the effects of the duration of visible impressions on the eye. He wrote well on fortifications, anticipated Castelli on hydraulics, occupied himself with the fall of bodies on the hypothesis of the earth's rotation, treated of the times of descent along inclined planes and circular arcs, and of the nature of machines. He considered, with singular clearness, respiration and combustion, and foreshadowed one of the great hypotheses of geology, the elevation of continents.—Draper.

Vinegar, a well known sour liquid described in science as acetic acid diluted with water. Vinegar is manufactured from wine, beer, malt juice, cider, beet-root juice, and

diluted spirits, by causing the portion of alcohol which they contain to unite with oxygen. This action is brought about usually through the agency of a fermenting yeast or by minute animal forms called vinegar eels. Sprouting starts the starch of grain on the way to sugar; fermenting turns sugar into alcohol; a second fermenting converts dilute alcohol into vinegar. The best vinegar is made from cider. It usually contains enough of the necessary eels or ferment to turn it into vinegar; if not, some mother of vinegar is added to start the process. Vinegar is a well known appetizer,—used with boiled cabbage, fresh lettuce, beets, salads, and the like. Although in a way a bacterial production, vinegar is a decided preservative. It is used to pickle young cucumbers, the rinds of watermelons, sliced tomatoes, onions, peaches, pears, and many other articles for table use. Pure vinegar is entirely wholesome. Like other sours, it is considered an anti-fat article of diet. It is subject to shameless adulteration with cheap drugs. A cheap vinegar made from wood, like ether alcohol, is much used in the arts. The housekeeper should take the precaution of keeping vinegar in wooden, glass, porcelain, or unglazed earthenware. Combined with lead or copper, vinegar produces a deadly poison. For this reason it should not be allowed to stand in a brass or copper kettle. See VERDIGRIS.

Vinland, in American history, a region somewhere on the eastern coast of North America. Certain Icelandic manuscripts known as the *Sagas* describe a voyage of discovery made about the year 1000 by Leif Ericson, a hardy Norse navigator. According to these accounts, he found a delightful country which, from the abundance of grapes, he named Vinland. This region was visited repeatedly by the Vikings, then forgotten. Some have endeavored to identify Vinland with the bay-indented, vine-embowered coast of Rhode Island, but its location is a matter of conjecture. It has been claimed that a knowledge of these Icelandic traditions of Vinland confirmed Columbus in his belief that land might be found by sailing westward from Spain.

Violet, a well known fragrant flower. The genera are distributed widely throughout the temperate zones and contain about 300 species. They are chiefly perennial herbs of the temperate zones. About forty species are native to the United States and Canada. The flowers are on the plan of five (five sepals, five petals, etc.), with an irregular corolla. The petals are of three different shapes; the lower one spurred. Some violets, particularly *viola palmata*, have underground flowers which produce large pods of seeds. The proverbial color of the violet is blue, but our most fragrant, delicate species is white, and a number of wood violets are yellow; while in the pansy, the descendant of a small European violet, blues and yellows strive with white in the same flower for predominance. In literature, the discreet violet is the type of modesty. It ranks with the lily and the rose. "To throw a perfume on the violet," is in Shakespeare's judgment to attempt an improvement of the perfect. See PANSY; PERFUME.

Violin, a well known stringed musical instrument. It consists of a resonant box or body, a neck, a bridge, pegs, four catgut strings, and a bow. The largest string is wound with fine silver-coated copper wire. The origin of the violin is credited to India, where mendicant monks still beg from house to house with an exceedingly primitive instrument regarded as the ancestor of the Italian violin. The violin of India is reputed to be several thousand years old. The Italian violin was brought to perfection by Stradivarius, a violin maker of Cremona, who lived 1644-1737. The utmost that can be done today is to imitate a Stradivarius. The violin bow was originally a slender piece of bamboo bent after the fashion of an archer's bow. The spring of the bamboo kept the hair taut, hence the name bow. Tourte, a Frenchman (1747-1835), is credited with bringing the modern bow to perfection. He decided that Brazil wood gives the greatest degree of lightness, spring, and flexibility. He decided upon the exact length of the bow, seventy-five centimeters, and the curve to be desired. He contrived the method now in use for holding the hairs flat.

The Chinese use an odd instrument which has all the parts of the violin save the resonant box. A cut of the affair looks something like a smoker's corncob pipe on a large scale. A section of bamboo supplies

the part corresponding to the bowl of the pipe, and a wooden stick takes the place of the stem. Two strings are stretched from the bowl-like head to two pegs in the far end of the stem. The hair of the bow is carried between the two strings instead of above both. This Chinese instrument is "sometimes atrocious, but not discordant."

The merely scientific principles of the violin are easily stated. The violin is played in accordance with the laws of vibrating strings. The four strings vary in weight. The right tension is secured by twisting the pegs. The bow, rubbed with rosin, grips the string with either an up or a down movement and sets it in vibration. The four strings at full length give four fixed tones and no others, but by using the fingers of the left hand to press down the strings upon the neck of the instrument any string may be shortened and its tone raised, the number and nature of the variations being limited only by the capacity of the performer. Harmonics may be produced by touching, not pressing, the strings at natural nodes. The violin is unquestionably the most human of all instruments. It can be made to sing, to laugh, to weep, or to scream—to express any emotion not absolutely requiring articulate speech.

Viper, a family of venomous serpents of the Old World, closely allied to the rattlesnake family of the New World. The name is Latin, meaning to bring forth alive. The young are produced alive, instead of being hatched from eggs. The common English name is adder, meaning simply a snake. As the adder is the only vicious serpent found in Great Britain, the translators of the King James Bible adopted the term. The common viper is about two feet long. It is of a yellowish brown, with a row of oblong black spots running lengthwise of its back, and a row of spots on each side. The head is oval with a blunt snout. The viper is the only venomous serpent in the greater part of Europe. It is neither common nor dangerous. Its bite is painful, but not fatal. Its reputation, however, accords well with the saying, "Look not upon the wine when it is red, when it giveth his colour in the cup, when it moveth itself aright. At the last it biteth like a serpent, and stingeth like an adder."

Virchow, Rudolf (1821-1902), a noted German scientist. He was a native of Prussia. He studied medicine in Berlin. Virchow is one of the great names in the annals of science. He won distinction in more fields than any other man of his country. He began his work as an assistant in a hospital, from which he rose rapidly to a directing position, introducing reforms yet remembered. In politics he was a Social Democrat. He took part in the revolutionary movement of 1848. He entered the Berlin municipal council in 1869, the Prussian Diet in 1862, and the Reichstag in 1880. He had the courage to oppose Bismarck's policy from beginning to end. He was for four years an active member of the Berlin aldermanic council. During this time he took an active part in the sanitation of the city, insisting that the sewage be forced through pipes to a sandy plain on the Spree where it is employed in fertilizing vegetable gardens.

Virchow's crowning claim to distinction rests, however, on his work in the field of pathology. Physicians give him credit for the establishment of the doctrine of cellular pathology, an epochal event in the history of medicine. While a layman is hardly competent to enunciate this doctrine, its fundamental features are of interest. To discuss this principle they may be stated. Every animal tissue is composed of cells and is derived from cells. No cell arises except as the offspring of a previously existing cell. Spontaneous generation of cells is unknown. Disease of the body is a disease of the cells. The cure of the body may be effected by curing the cells. The real question which the modern scientific physician puts to himself when called to treat a case, is What cells are out of order and what can be done for them?

Vireo, vĭr′ē-ō, an American family of singing birds. There are about fifty species, chiefly tropical. Half a score nest in the temperate parts of North America. The nests of the different species vary, but in general they hang from the slender forked twigs of low bushes and small trees, and are made of all sorts of shreds and fibers, grass, cotton, spider's web, bark, and tendrils. They are covered frequently with gray lichens to afford concealment. All

vireos are small birds, scarcely, save the red-eyed vireo, reaching six inches in length. As a family the vireos are gifted in song. They are modest gray and olive green birds, living on insects, for which they patiently explore the cracks, crannies, buds, and leaves of trees.

Virgil, or **Vergil,** vẽr′jĭl (70-19 B. C.), a Roman poet, the foremost writer of the Augustan age. Virgil is the English spelling; Vergilius the Latin. He was born near Mantua, Italy, October 15, 70 B. C., and died at Brundisium, September 21, 19 B. C. Accounts of his early life are uncertain. Virgil's father, said by some to have been a potter, by others a farm laborer, married the daughter of his employer and became possessed of a small farm on which he supported himself by farming and by keeping bees. He sent his boy to the best schools at Cremona, Naples, and Rome. Virgil was a diligent student of Greek literature, rhetoric, philosophy, medicine, and mathematics. He was dyspeptic and subject to headache. Unlike ambitious young men, he preferred a quiet life to politics and the army. He appears to have retired to his father's farm and to have busied himself with literature and the care of the estate. He never married. Unlike Byron, Moore, and Burns, he is not known to have engaged in intrigue or in an affair of the heart. He was a shy, modest man, so averse to public attention in the days of his fame that he was known to take shelter in doorways to avoid meeting a party of people who would be likely to insist on complimenting him.

After the battle of Philippi in 42 B. C. he was awakened rudely from his life of seclusion and meditation by the wholesale seizure of lands to reward the veteran soldiers of Octavius and Antony. One report has it that he was rudely handled by the soldiers, being allowed to escape merely with his life. He set out for Rome to plead his cause in person. Here he was fortunate enough to attract the attention of Maecenas, the prime minister, himself a patron of letters. Virgil was granted a new estate nearer Rome, and became henceforth a member of the literary circle to be found in that city.

Among other kindly acts he is said to have introduced Horace to the notice of the court. Maecenas saw to it that Virgil enjoyed a liberal income. In the absence of printing, the poet of that day read his productions from manuscript. Scribes were employed to make copies for the wealthy. We learn that Virgil was a broad-shouldered, dark-complexioned man with a certain rustic air quite delightful in contrast with the forward beaux of the day. He and his poems, therefore, were the leading social attraction at Rome. In 19 B. C. he undertook a journey to Greece and Asia Minor to study more closely the geography of the regions described in his leading poem, the *Aeneid.* He was not well and went only as far as Athens, turning back to die at Brundisium. He was buried near Naples, but the spot occupied by his tomb is now a matter of uncertainty.

The earliest poems of which we have positive knowledge are ten pastoral poems called *Eclogues* or *Bucolics.* The themes and language were supposed to be drawn from the lives of shepherds. The poems were close imitations of the *Idyls* of Theocritus, the Greek. His next great work, said by Addison to be the most finished and one of the most perfect poems in any language, was the *Georgics.* It was written apparently to point out the attractiveness of rural life. The cultivation of fields, crops, tree planting, stock raising, and bee-keeping are described with lightness of touch, wealth of allusion, and with many a digression. The ancient poets and, no doubt, his own experience are drawn upon freely. The style is delightful. The poet lingers lovingly on his themes after the manner of Izaak Walton in his *Compleat Angler.* Virgil's masterpiece, however, is the *Aeneid,* an epic commemorating the fall of Troy and the wanderings of the Trojan prince Aeneas, until, "having compassed land and sea, he laid the walls of lofty Rome." The theme of the poem and many of the incidents are in part the same treated by Homer in the *Iliad* and in the *Odyssey.* Virgil was hailed at once as the equal of the Greek poet. He and the *Aeneid* created a social furore. After the fashion of the time, Virgil brought in the royal family, making out Aeneas as the remote ancestor of Augustus. Virgil was a

VIRGIL, HORACE AND VARUS AT THE HOUSE OF MAECENAS

From the Painting by C. F. Jalabert

dramatic reader. In book six he introduced (lines 860-886) a beautiful allusion to the loss of Marcellus, the son of Octavia, the sister of Augustus. On the occasion when he read this passage before the reigning family, Octavia is said to have fainted with emotion. On her recovery she sent him a present of $500 (10,000 sesterces) for each line of the passage. The *Aeneid* was used as a reading book in school. Critics have not failed to point out that Virgil borrowed freely from Homer. He has been accused of lacking originality and strength, but as time goes by his reputation holds well with Dante, Chaucer, and Spenser. The first printed edition of Virgil's poems was issued at Rome in 1469. Up to that time the poems had been preserved in manuscript. This is the basis of present editions. The only complete or nearly complete manuscripts are three, dating from the fourth and fifth centuries. They are preserved in the Vatican Library at Rome.

On the nineteenth centenary of Virgil's birth the citizens of Mantua held commemorative exercises. By request, Tennyson wrote his lines *To Virgil* to be read on the occasion. See AENEAS; TROY; DIDO; AUGUSTUS; MAECENAS.

Virginia, vĕr-jin′ĭ-a, one of the south Atlantic states, is known also as "The Old Dominion" and "The Mother of Presidents." The shape is roughly triangular, resting on the parallel of 36° 30′ and bounded on the two other sides by the main crest of the Alleghany Mountains and the Potomac River. The end of the peninsula between the Chesapeake and the Atlantic south of 38°N. is part of Virginia. Virginia borders with five states. The extreme length from east to west is 475 miles. Land area, 40,262 square miles.

THE PEOPLE. The fourteenth census of the United States gave 2,309,187 as the number of Virginia's inhabitants; the Negro population was 690,017, or about one-fourth of the total; and the foreign born numbered only 30,785. The people are distributed in the proportion of 57.4 to a square mile, and are 23.1 per cent urban. The capital and largest city is Richmond, with a population of 171,677; Norfolk is the second city, with 115,777 inhabitants. Four other cities have more than 30,000 people, and four have populations of from 10,000 to 21,000.

TOPOGRAPHY. There are three well marked physical regions—the coastal plain, the piedmont region and the mountain. The first is a low, level, sandy tract, intersected by broad rivers in which the tide rises and falls as in the arms of the sea. In their lower courses, the James, the York, the Rappahannock and the Potomac are noble streams. The northwestern side of the state is occupied by the parallel ranges of the Alleghanies and the Blue Ridge. They inclose the famous valley of the Shenandoah. Between the coastal plain and the mountains lies a piedmont region, a part of the foothill district which follows the Blue Ridge as far as Georgia. A remarkable feature of the mountains is the frequent occurrence of water gaps. The Roanoke, the New and other rivers cross the mountain chains at right angles through deep gaps. Geologists explain the fact by supposing that the rivers were running before the mountains were formed, and that they kept their old courses, cutting away the gaps as the mountain ridges or wrinkles rose slowly—possibly but a few inches in a century.

CLIMATE. The climate is agreeable. The mountains afford shelter from the northwest winds of winter. The sea affords breezes in summer. To the inhabitants of Georgia, Virginia seems like a sort of Switzerland; to the New Englander, it seems quite warm. The annual rainfall is from thirty-five to fifty inches, well distributed through the year.

MINERALS. The state has great mineral wealth. The settlers of Jamestown found gold and iron. The first coal mined in the United States was obtained in Virginia. The annual production is now between 6,000,000 and 7,000,000 tons. Other natural products are cement, iron, gypsum, manganese, salt, mineral water and potter's clay. There are excellent building stones, including granite, limestone, marble and slate. The stone and clay products are especially important, and copper, zinc, arsenic, feldspar and mica are produced in small quantities.

FORESTS. The state was covered originally with valuable forests. Cedar and walnut timbers were among the valuable articles sent home for sale by the early employes of the Virginia Company. The coast was forested with loblolly and long-leafed pine. As the settler penetrated the interior, he found forests of oak, ash, poplar and walnut. Sawmills were established as early as 1630. The lumber cut averages 800,000,000 feet annually. The last Federal estimate of the amount of standing timber returned 14,000,000 acres as Virginia's share; thus a bit less than half the state is still forested.

AGRICULTURE. Tobacco is regarded as the staple crop. As a matter of fact the corn crop and the hay crop are worth more money, but they are consumed largely at home. Tobacco is relied upon for revenue. Lynchburg, Danville and Richmond are noted tobacco markets. Winter wheat is the fourth crop in value, oats, buckwheat and barley follow. Norfolk is the greatest peanut market in the world. The southern tier of tidewater counties raise cotton, but Virginia has a smaller annual cotton crop than has any other state in the South. There are broad pastures of bluegrass, and in recent years much attention has been given to the raising of pure stock. In the piedmont region all of the large orchards are found, and the fruit crop adds considerably to the state's agricultural importance. In 1920 there were more than 7,800,00 bearing fruit trees. Apples are raised in large quantities.

MANUFACTURE. The manufactures are grouped largely in the piedmont region where advantage can be taken of water power. The chief manufacturing industries are engaged in making iron and steel, lumber and wooden articles, tobacco products — including chewing and smoking tobacco and snuff, cigars and cigarettes— railroad cars, leather and machinery. By the last industrial census Virginia had 5.603 manufacturing establishments producing more than $640.000,000 worth of goods annually. The cotton mills of the state are steadily increasing in number even though the cotton crop is small.

TRANSPORTATION. Virginia has 4,693 miles of railroads, several navigable rivers, and is served by coasting and transatlantic steamers. The principal railroads are the Norfolk & Western, Chesapeake & Ohio, Southern, Virginian, the Atlantic Coast Line and Seaboard Air Line. Lumber, cotton, grain and naval stores are shipped from Norfolk and Norfolk and Newport News are great coal ports.

INSTITUTIONS. The charitable and correctional institutions are supervised by a state board of control. The institutions are the Central State Hospital, Eastern State Hospital, Southwestern State Hospital, Western State Hospital, Catawba Sanitarium, Virginia State Epileptic Colony, Virginia Colony for the Feeble-Minded, penitentiary, Virginia Home and Industrial School, Industrial Home and School for Colored Girls, State School for the Colored Deaf and Virginia School for the Deaf and Blind.

EDUCATION. Primary education is free and is compulsory upon all between the ages of eight and twelve. In 1920 there were 13,597 public elementary and 673 public high schools and seven public normal schools. The state maintains the University of Virginia, William and Mary College, Virginia Polytechnic Institute, and Virginia Military Institute. Other higher institutions are Hampden-Sidney College, Washington and Lee University, Randolph-Macon Woman's College, Virginia Christian College, Fredericksburg College, Roanoke College, Bridgewater College and Emory and Henry College.

The state university, at Charlottesville, was founded in 1819 and the first students attended in 1825. It is organized into colleges of arts and sciences, law, medicine, agriculture and philosophy. The enrollment was 4,189 in 1922, and in that year the faculty numbered 100. The library contains upwards of 100,000 volumes.

GOVERNMENT. Virginia is governed under its fifth constitution, adopted in 1902. This instrument provides for a legislature divided into an upper and a lower house. The senators number from 33 to 40; representatives from 90 to 100.

The executive body is composed of the

governor, secretary of state, lieutenant-governor, treasurer, superintendent of public instruction and commissioner of agriculture. Each of these officials is elected for four years.

The judiciary is composed of a supreme court of one chief justice and four associates, circuit courts and municipal courts. Supreme court justices are elected for twelve years, the other justices for eight years.

HISTORY. The first permanent English settlement within the present border of the United States was made at Jamestown, May 13, 1607. The first Indian war occurred in 1622. Virginia took an active part in the French and Indian War, and stood staunchly by the American cause in the Revolution. A Virginian drew up the Declaration of Independence. A Virginian commanded the colonial forces, and Cornwallis was forced to surrender on Virginian soil. The state was the tenth to ratify the Constitution. It has furnished six Presidents: Washington, Jefferson, Madison, Monroe, Tyler and Wilson. Virginia was the first state to adopt a written constitution (June, 1776) designed to provide a permanent government. Though one of the last states to secede, Virginia bore the brunt of the Civil War. Richmond was made the capital of the Confederacy and the capital became the object of the Federal campaigns. Robert E. Lee, "Stonewall" Jackson and J. E. Johnston were Virginians. The battles of Bull Run, "Sheridan's Ride," the Peninsular campaign, the contest of Fredericksburg, the series of battles in the Wilderness and the surrender at Appomattox took place on Virginian territory. The state suffered terribly. Stock was killed, buildings were reduced to ashes, and fences were burned for firewood. Some plantations have never been reoccupied. The close of the war found the state poverty stricken and deeply in debt. There are few instances of greater pride, effort and integrity. The state has provided for its debts, established a double system of schools, and has fought its way back to a rapidly increasing prosperity.

The first slaves held by English colonists were brought to Virginia by a Dutch trading vessel in 1619. In 1705 the Virginian slaves were declared a part of the real estate. Like the Russian serfs, they were sold with the land but could not be separated from it. This act was never enforced. It ceased to be a law when Virginia became a state. In the old plantation life of Virginia, the best side of slavery was to be seen. The state has led in the effort to educate the Negro.

See WEST VIRGINIA, and special articles on POTOMAC; CHESAPEAKE; DISTRICT OF COLUMBIA; MOUNT VERNON; JAMESTOWN; BACON'S REBELLION; RALEIGH; BERKELEY; SMITH; POCAHONTAS; RICHMOND; HENRY; CORNWALLIS; WASHINGTON; JEFFERSON; MARSHALL; MADISON; MONROE; TYLER; DAVIS; LEE; CONFEDERACY; JACKSON; BULL RUN; TOBACCO; PEANUTS.

STATISTICS. The following are the latest reliable statistics available:

Land area, square miles	40,262
Water area, square miles	2,365
Forest area, acres	14,000,000
Population (1920)	2,309,187
Negro	690,017
Indian	824
Foreign born	30,785
Chief Cities:	
Richmond	171,667
Norfolk	115,777
Portsmouth	54,387
Roanoke	50,842
Newport News	35,596
Number of counties	100
Members of state senate	40
Members of house of representatives	100
Salary of governor	$5,000
Representatives in Congress	12
Assessed valuation of property	$1,333 273.322
Bonded indebtedness	$22.912,216
Farm area, acres	18 561 112
Improved land, acres	9,460 492
Corn, bushels	47 600 000
Potatoes, bushels	14.688.000
Wheat, bushels	8,301.000
Sweet potatoes, bushels	4,180 000
Oats, bushels	3,342,000
Rye, bushels	418,000
Tobacco, pounds	91,850 000
Cotton, bales, (500 lbs.)	16 000
Hay, tons	939 000
Wool, pounds	1,680 000
Peanuts, pounds	109,068,000
Domestic Animals	
Horses	351.000
Mules	65,000

Milk Cows	428,000
Other cattle	567,000
Sheep	714,000
Swine	1,206,000
Manufacturing establishments	5,603
Capital invested	$463,644,498
Operatives	119,352
Raw material used	$371,540,833
Output of manufactures	$643,511,621
Sorghum syrup, gallons	1,079,000
Coal, tons	6,964,000
Iron ore, tons	320,000
Pig iron, tons	67,239
Lumber products	
Miles of railway	4,693
Teachers in public schools	15,720
Pupils enrolled	460,296

Virginia Creeper, or **Ampelopsis**, a fine climber. It is often called American ivy and woodbine. Flowers inconspicuous, July; blackberries in October. From five to seven leaflets spread out like the fingers of the hand. The creeper climbs over trunks of trees and walls by means of tendrils, terminating in flat disks or suckers. The foliage is handsome all summer, turning in autumn to a brilliant crimson. The creeper is a member of the vine family to which our wild grapes also belong.

Virginia, Minn., an important iron mining center, is on the Great Northern, Duluth, Missabe & Northern, Duluth, Winnipeg & Pacific and Duluth & Iron Range railroads, 75 miles northwest of Duluth. The iron mines of the Mesaba and Vermillion ranges and the forests of valuable timber, are the mainstays of the city.

Virginia has the largest white pine lumber mill in the world, 11 modern graded schools, a $2,000,000 technical and vocational high school, a public library, 14 wholesale houses, a county court house, a new city hall and recreational building, 2 city parks and an interurban line. The city is strictly modern in every respect—gas, water, city heat, sewerage and all streets paved. The population in 1920 was 14,022.

Virgin Islands, a group of small islands a few miles east of Porto Rico. In 1917 they were purchased from Denmark by the United States for $25,000,000, because of their value as a naval base and as a protection to the Panama Canal. They were formerly known as the Danish West Indies. Only three of the Islands—Saint Thomas, Saint Croix and Saint John—are of any significance. Saint Thomas has a good harbor. Population 18,000.

Virgin's Bower, a climbing clematis with inconspicuous flowers, shady foliage, and seeds clothed with long plume-like tails. A common thicket climber in eastern North America.

Virgo, the sixth sign of the Zodiac, represented in ancient astrology by the wing as a symbol. The sun enters this sign about August 20. It is also a constellation, formerly in the sign Virgo, but now in Libra. During May and June it can be seen on the meridian during the evening. It contains the star Spica.

Vishnu. See BRAHMA.

Visigoths, vĭz'ĭ-gŏths, the western branch of the Goths. Their great leader was Alaric. They captured Rome in 410 and turned their victorious arms toward France and Spain. They established a Visigothic kingdom in Spain, adopted the Catholic faith, and merged with the native Spaniards into one nation. After lasting three hundred years, their kingdom was overthrown by the Saracens. Later they rallied and took a prominent part in the expulsion of the Moors. The Goths have been absorbed by the dark-haired Spaniards, but many words in current use in Spain to this day are of Visigothic origin. See GOTHS; ALARIC.

Vision of Sir Launfal, The, a poem by James Russell Lowell published in 1848. The story of the poem is based on the legend of the Holy Grail and the search for it made by King Arthur's knights, as told in the old stories of Arthur and his Round Table, but the plot is original. The poem is allegorical and is full of spiritual feeling. Sir Launfal, believing himself to be inspired by true religious zeal, vows that he will never again enter his castle till he has sought and found the Holy Grail. So on the night before he is to depart he sleeps outside on the rushes. In sleep the "vision" comes to him. He sees himself first as a young man, proud, scornful, unloving; then as an old man, compassionate and full of love for his fellows. A leper with whom he shares his last moldy crust appears to him glorified, "shining and tall and fair and straight."

"Lo, it is I, be not afraid!
In many climes, without avail,
Thou hast spent thy life for the Holy Grail;
Behold, it is here,—this cup which thou
Didst fill at the streamlet for Me but now;
This crust is My body broken for thee,
This water His blood that died on the tree;
The Holy Supper is kept, indeed,
In whatso we share with another's need;
Not what we give, but what we share—
For the gift without the giver is bare;
Who gives himself with his alms feeds three,—
Himself, his hungering neighbor, and Me.

So Sir Launfal learns his lesson. He hangs away his armor and makes use of the opportunities close at hand.

And there's no poor man in the North Countree
But is lord of the earldom as much as he.

Vitamins, a name applied to certain organic substances of unknown constitution, which are essential to the proper nourishment of the body. These substances, of which little is definitely known because they cannot be isolated in quantities sufficient for study, were first called vitamins by Dr. Casimir Funk, a Pole, in 1912. The vitamins have, however, been more or less definitely grouped according to certain of their properties, the chief of which is their solubility. Two of the vitamins were, on this principle, named "Fat-soluble A," and "Water-soluble B," by Dr. E. V. McCollum, of Johns Hopkins University. The third important vitamin is named "Vitamin C."

Vitamin "A" is widely distributed, being present in cod liver oil, cabbage, milk, egg yolk, beef, oil margarines, etc. The absence of this vitamin from the diet of infants is known to be the chief cause of rickets. Vitamin "B," called the antineuritic vitamin, is present in milk, yeast, peanuts, unpolished rice, kidney beans, etc. Vitamin "C," called the anti-scorbutic vitamin because it protects against scurvy is present in fruit juices.

It was in the investigation of such diseases as those already named, and others, that the importance of vitamins to health was first discovered. It was found, for instance, that the extensive use of polished rice caused beri-beri, a disease prevalent in the Philippine Islands, where polished rice is the staple food. When unpolished rice is substituted, the disease disappears, thus showing that in the rice hull are contained the vitamic substances necessary to the avoidance of this disease.

The recognition of the importance of these food elements has necessarily caused a general dietetic reform. It is known that while the amount of vitamins essential to health is very small, this small amount must accompany the carbohydrates, fats, proteins and mineral salts. It is also known that vitamins are to be found in the food we eat, and not in any of the many pills and compounds with which the drug market abounds.

From the table here given one may learn what vitamins are present in different foods:

RELATIVE VITAMIC CONTENT OF COMMON FOODSTUFFS

Vitamins	"A"	"B"	"C"
Bread, white (water)	3	5	4
Bread, white (milk)	5	5	3
Bread, whole wheat (water)	5	6	3
Bread, whole wheat (milk)	6	6	3
Barley (whole)	5	6	4
Corn, yellow	5	6	4
Oats	5	6	4
Meat, lean	4 to 5	5 to 3	5 to 3
Beef, fat	5	4	4
Mutton, fat	5	4	4
Oleomargarine	5	4	4
Liver	6	6	5
Kidney	6	6	5 to 3
Sweetbreads	5	5	2
Fish, lean	4	5	2
Fish, fat	5	5	2
Fish Roe	5	6	5 to 3
Milk, fresh	7	6	5 to 1
Milk, condensed	7	6	5 to 1
Milk, skimmed	5	6	5 to 1
Buttermilk	5	6	5 to 1
Cream	7	6	5 to 1
Butter	7	4	4
Cheese	6	2	2
Eggs	6	5	5 to 3
Almonds	5	5	2
Cocoanuts	5	6	2
Hickory nuts	2	6	2
Peanuts	5	6	2
Pecans	2	5	2
Walnuts	2	6	2
Tomatoes (raw or canned)	6	7	7
Beans, kidney	2	7	2
Beans, string (fresh)	6	6	6
Cabbage, fresh raw	5	7	5 to 3
Cabbage, cooked	5	6	5 to 3
Carrots, fresh raw	6	6	6
Carrots, cooked	6	5	5
Cauliflower	5	6	5
Celery	2	5	2
Cucumber	2	5	2
Eggplant, dried	2	6	2
Lettuce	6	6	7

Onions	2	6	6
Parsnip	4 to 3	6	2
Peas	6	6	5 to 3
Potatoes (boiled 15 min.)	2	6	5 to 3
Potatoes (baked)	2	6	5
Sweet potatoes	6	5	2
Spinach, fresh	7	7	2
Spinach, dried	7	6	2
Squash, hubbard	6	2	2
Turnips	4 to 3	6	2
Apples	5	5	5
Bananas	5 to 3	5 to 3	5
Grape juice	2	5	5
Grapefruit	2	6	6
Lemon juice	2	6	7
Orange juice	5	6	7
Prunes	2	5	4
Raspberries (raw or canned)	2	2	7

1—Variable.
2—Evidence lacking or insufficient.
3—Doubt as to presence or relative amount.
4—No appreciable amount of vitamin.
5—Contains the vitamin.
6—Good source of vitamin.
7—Excellent source of vitamin.

It is apparent from this table that certain diseases—such as rickets, for which cod liver oil is a certain cure—may be kept from the home by the simple choosing of proper foods and their intelligent preparation.

Vitriol, vĭt′rĭ-ŭl, or **Oil of Vitriol,** sulphuric acid. It is composed of hydrogen, sulphur, and oxygen. It is an oily acid with a strong affinity for water. A drop poured on wood absorbs the moisture and leaves a charred spot. Poured on the skin of one's hand it draws out the water and leaves a painful sore difficult to heal. In the laboratory sulphuric acid must be handled with care. A slight amount spilled on woolen clothing will eat holes in it, or, if the amount be sufficient, it will burn the body, causing death. Vitriol or sulphuric acid is used in many industries where it is desired to free substances from animal or vegetable matter. Blue vitriol, consisting chiefly of sulphur and copper, is the basis of Scheele's green and paris green. It is used extensively in coloring papers, calico printing, gravity batteries, electro-plating, and especially as a spray in vineyards to kill insects, etc. Green vitriol, or copperas, literally, copper rose, is a sulphate of iron. It is usually of a green color, and is derived commercially from iron pyrites. It is employed in dyeing black, and as a developing agent in photography. Copperas forms an excellent black ink. It is also added to water, say a pound to the gallon, for a disintectant for sinks and sewers. The slightest trace, a drop in a million, added to water in a reservoir, kills the typhoid germ. White vitriol is a sulphate of zinc. Red vitriol a sulphate of cobalt. See SPRAYING; GREEN; DYEING.

Vizier, vĭz′yĕr. See TURKEY.

Vladivostok, a Russian port on the Pacific, the capital of the maritime province of Siberia. Vladivostok is situated on a harbor which communicates through the Gulf of Peter the Great with the Sea of Japan. The city was founded in 1861. The harbor is fortified strongly. The Trans-Siberian Railway reached the port in December, 1901. There are large dry docks, waterworks, electric street railways, and electric lights. Lines of steamers ply to ports of Japan and Korea. The old Russian government subsidized a line running to Seattle, Washington. Under ordinary circumtsances the port is closed by ice during three winter months, but steam icebreakers are relied upon to keep the channel open. The population is given at 91,464, including a large garrison of Russian soldiers.

Vocational Guidance. Vocational guidance is the first step in vocational education. It consists in the intelligent direction of the youth in the choice of a vocation. At first vocational guidance was restricted to assisting young people from the age of fourteen to sixteen or during that period of adolescence in which youth is self-assertive and restless. Thousands of young people leave school at this period urged by a desire to earn money, to escape the restraints of the school, to try something new—to do anything for a change. The constantly increasing number of boys and girls leaving school before the completion of the work of the seventh and eighth grades, and the fact that only about one-fourth of the pupils who finish the eighth grade enter the high school, convinced many leading educators, business men and in some states legislators that radical changes in our schools were necessary.

Among the changes which have been gradually adopted are a closer relation of the work of the school to the industrial life of the community, and vocational guidance.

The work is usually by a vocational counselor who may be one of the regular teachers, or in large schools, some one who devotes his or her entire time to the work. The vocational counselor should be sympathetic and one with whom the pupils feel free to discuss their problems. He should be thoroughly familiar with the course of study and also have such knowledge of the various occupations as will enable him to set forth clearly the advantages and disadvantages of each and to state the requirements necessary to success in each. The most important of the vocational counselor's requirements is his aptitude in understanding children and his ability to discover their likes and dislikes and to forecast as far as possible the vocation in which each pupil will be most likely to succeed.

At the beginning, the chief purpose of vocational guidance was the preparation of the pupil for an immediate job. The work was superficial and the results were unsatisfactory. Educators were soon convinced that vocational guidance, if it were to be successful, must include far more than superficial preparation for a job, and on this assumption vocational guidance has been developed until it occupies a prominent place in our educational system.

Purposes. The purpose of the vocational counselor is three-fold: to arrive at a thorough understanding of the child while in school; to become acquainted with his home environments and through cooperation of the parents to keep the child in school as long as possible, and to assist him in making a wise choice in selecting his vocation. To be successful, vocational guidance must be accomplished through suggestion, leaving to the pupil the final decision, and it must be opportune. The youth is prone to make decisions on impulse. When such a crisis arrives the vocational counselor should be prepared to give helpful suggestions and without delay.

Many of these problems relate to leaving school and the wise counselor can in most cases lead the pupil to continue his studies by encouraging him to take a long look ahead, and, when necessary, secure the cooperation of the parents.

Supervision. Sometimes necessity compels the pupil to leave school and engage in some gainful occupation. In such a case the pupil should be encouraged to continue his studies at night school or by availing himself of such other facilities as may be offered. The counselor should occasionally consult the pupil's employer to learn of his progress. When necessary the counselor should give the young employe suggestions for improving his work. Sometimes employes request such suggestions. Every boy and girl should be encouraged to give the chosen vocation a fair trial. If, in due time, it is ascertained that the employe is not suited to his occupation he should be given a trial at some other. In part-time schools in large cities where the pupil spends a portion of the day at his employment and a portion in school, the follow-up system is much closer than is otherwise possible.

The early work period is the most critical because of the necessity of physical, emotional and social adjustments, and the boys and girls need to feel that their counselors and teachers as well as their parents are ready to assist them in every possible way.

The Rural Problem. The teacher of the one-room rural school is confronted with all the problems common to the vocational counselor of the city school and the additional one of keeping the boys and girls on the farm. Vocational guidance in the rural school becomes preeminently a community problem. Many young people who go to the city and fail might be led to remain in the country where they would doubtless succeed. To this end the teacher needs to enlist the home, the church and whatever other organizations may exist in the community in a general movement to make country life attractive to young people. See Boys' and Girls' Clubs; Canning Clubs; Community Center, in these volumes.

Conclusion. Vocational guidance should assist boys and girls during the school period of life to acquire an education that will develop their powers in such a way as to strengthen the desirable aptitude of each pupil; to make the pupils acquainted with the various vocations open to them and to assist any pupil who may desire assistance in selecting the vocation he may enter.

"The vocation of the youth is to make a business of getting an education, rather than to assume that anyone's business is to predetermine his final vocation."

Voice, the sound produced by the vibration of the vocal cords in the larynx, these vibrations being caused by air from the lungs passing between the cords. The cords are elastic, are formed of mucous membrane, and are set close together, their position, size, and tension determining the pitch of the voice. The greater the tension, the higher is the sound produced. The male voice has a low pitch—in singing it is known as tenor and bass—because the cords are longer than those of the female, whose voice is classed as soprano or alto. In speech, man's voice ranges an octave lower than woman's. The compass of the average human voice is about two octaves, the ear, however, possessing the power of hearing the musical notes of eleven octaves. The quality of the voice depends not only on the strength and elasticity of the cords, but also on the nature and size of the walls of the larynx, and the cavity of the throat and mouth. Proper breath control is also an important factor in producing purity of tone. In singing, the voice is distinguished as soprano, mezzo, alto, tenor, baritone, and bass. The modulations of the singing voice are controlled by the vocal cords, the tongue, the nasal, oral, and laryngeal spaces, and its range is determined by the amount of tension which can be brought to bear on the cords.

Voice is distinct from speech, where the chief function of sound is oral conveyance of ideas. Voice alone is not a distinct vehicle of thought and language.

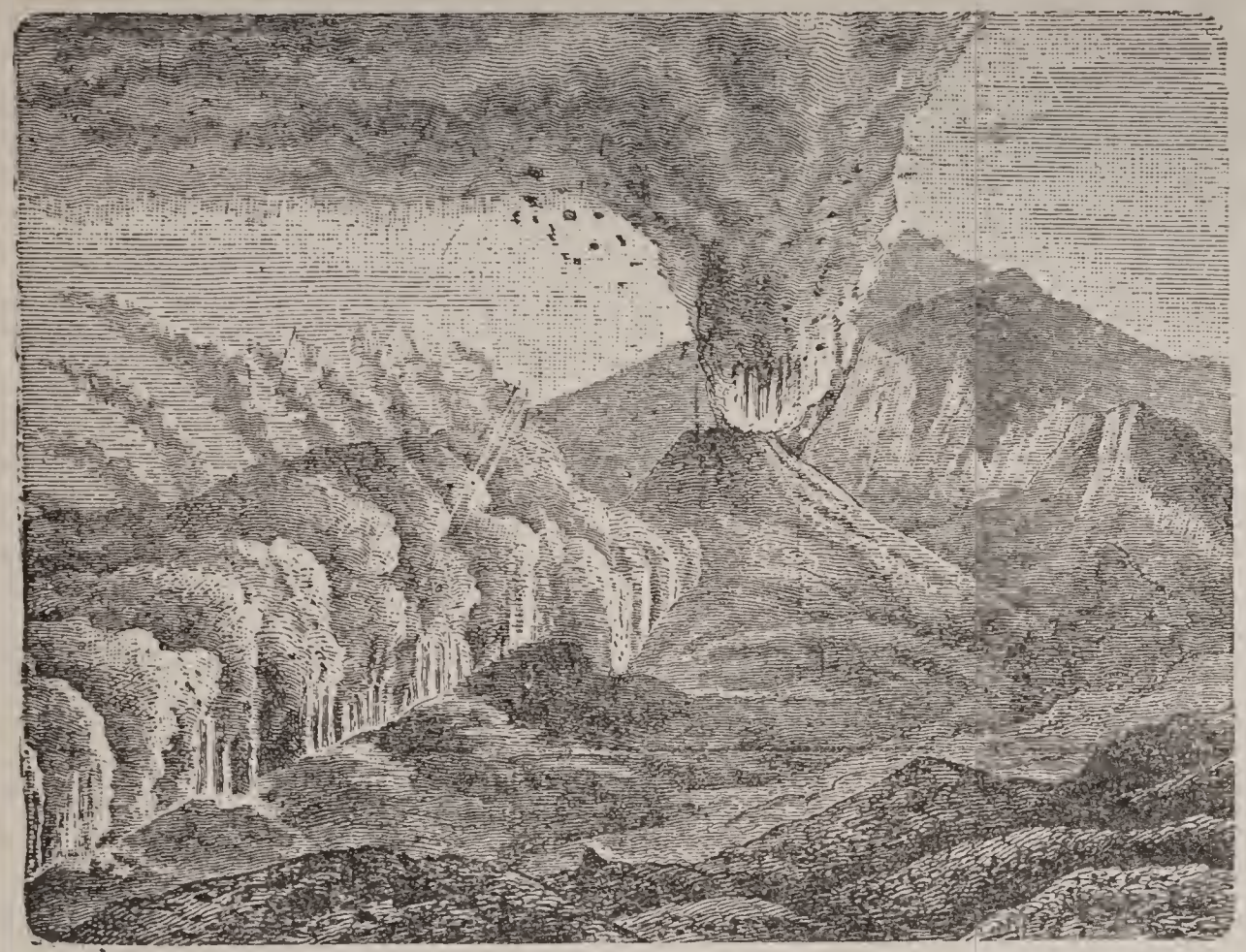
Volcano, a mountain or hill from which lava, heated rock material, and gases are ejected. The term was applied first to Mount Etna, the supposed home of Vulcanus, the god of fire. The material ejected is apt to give a volcano the form of a cone. The opening is surrounded usually by a pit-shaped cavity called a crater. The crater of Mauna Loa in Hawaii is 13,000 feet wide and 800 feet deep. Frequently there are many additional small openings. Within ten miles of the main crater, Mount Etna has over two hundred small vents. Many volcanoes have been quiet so long that they are regarded as extinct. Many such cold, lofty peaks exist in the Sierra Nevada Mountains of California. Volcanoes not lately in a state of eruption but which are thought likely to be resting only, are termed dormant.

Volcanoes vary greatly in height. Some are scarcely above sea level. Vesuvius is 4,000 feet high. Cotopaxi in the Andes is the highest active volcano. It rises through the clouds to an altitude of 20,000 feet. There are over three hundred active volcanoes. They are widely distributed. A series encircles the Pacific Ocean; a second series runs east and west, including the volcanoes of the West Indies, the Canaries, the Azores, and the Mediterranean region. Where the Pacific circle crosses the east and west series volcanic activity is marked. The region of greatest volcanic activity is that of Java and adjacent islands. Latitude appears to have no influence. Erebus within the Antarctic Circle reddens the southern sky, and Mount Hecla in Iceland rivals Vesuvius in activity.

Pompeii was overwhelmed by an eruption of Vesuvius in 79. Late in August, 1883, an eruption in an island in the Strait of Sunda created a cavity into which the sea rushed with violence, setting waves in motion that overwhelmed and drowned villages. The cause of eruption is not known with certainty but it is believed that internal heat forms gases that expand and drive out the molten material as exploding powder drives the bullet from a gun.

See LAVA; BASALT; HECLA; ETNA; VESUVIUS; POMPEII; COTOPAXI; STROMBOLI; GEYSERS.

Volga, the longest river of Europe. It rises in the marshes of the Valdai plateau and flows in a general southerly direction through Russia, emptying by a delta into the Caspian Sea. It is the largest inland river in the world. The best known cities on its banks are Nijni-Novgorod and Astrakhan. It is about 2,400 miles in length and is navigable throughout the greater part of its course. With its tributaries it affords 7,000 miles of waterway. It is connected by canals with the Baltic and with them forms a waterway of great importance leading from the Baltic to the Caspian. The fisheries of the Volga are also of im-



Eruption of a small crater of Aetna.

The interior of the crater of Vesuvius, 1880.

The crater of Aetna. 1805.

The crater of Aetna. 1909.

portance. See NIJNI-NOVGOROD; ASTRAKHAN; STURGEON; CASPIAN.

Volta, Alessandro (1745-1827), an Italian scientist. He was professor of physics at Como and afterward at Pavia. In 1800 Volta described the apparatus since called the Voltaic pile. Volta has been further honored by the use of the terms, Voltaic cell and Voltaic electricity. Still more significant is the name "volt" applied to the unit of electro-motive force. The gravity cell usually seen in telegraph stations has an electro-motive force of about a volt.

Voltaire, vŏl-têr′ (1694-1778), a famous French writer. He was born at Chatenay, a little town near Paris, November 21, 1694, and died at Paris, May 30, 1778. The greater part of his life, however, was passed abroad,—at London, Berlin, and Geneva. His father was a French notary, a man of property. The young man abandoned the family name of Arouet for Voltaire, the origin of which is unknown. He was educated at the famous Jesuit College of Louis-le-Grand. He was a brilliant student. His wit, lively manners, and his father's wealth procured him entrance to the so-called best society of Paris. His biting tongue got him into trouble frequently. Twice he was confined in the Bastille. He made a pretense of studying law, but, like Irving, Scott, Lowell, and many another man of letters, he spent his time in reading, and finally abandoned the law for literature. A successful tragedy or two made him the fashionable poet of Paris. He was too free spoken, however, to enjoy France.

In 1726 he went to England, where he remained for two years. He then lived for two years in the household of a widow in Champagne. Upon her death, he accepted an invitation from Frederick the Great to take up his residence at Berlin. Voltaire and Frederick met almost as lovers. They lived together three years and parted bitter enemies. The French government forbade Voltaire's return to France. He wandered about, finally taking up his residence in 1756 at Geneva. He purchased an estate in the suburban village of Ferney, where he spent the remainder of his life. He found the village a wretched place containing forty-nine peasants. **He left it a thriving,** happy town of 1,200 inhabitants, among whom he lived in the character of a patriarch and benefactor.

The list of Voltaire's works is a long one, in all seventy-two volumes. He tried his hand at tragedy, lyric poetry, oratory, essays, political pamphlets, novels, history, and even science. All his works were permeated with bitter hostility to Christianity, particularly Catholicism, and arbitrary government. He was a great admirer of the institutions of England.

Voltaire was a fighter. No matter whether a wrong was committed in Paris, London, Berlin, or Rome, a stinging rebuke was sure to follow from Voltaire's pen. He was hated as few men have been hated. He was a contributor to the famous French Encyclopedia. Without doubt he did much to bring on the French Revolution, at the close of which the French authorities brought home his body and buried it in the Pantheon of Paris. Voltaire's works are now seldom quoted. He was a master of satire.

SAYINGS

Dirty linen to wash.

The superfluous, a very necessary thing.

Who serves his country well has no need of ancestors.

History—a picture of human crimes and misfortunes.

Voronoff, Serge, an eminent Russian surgeon who has lately made a remarkable record of success in glandulartherapy. Though born in Russia, Dr. Voronoff has lived most of his life in Paris, where he was educated. He is Director of Experimental Surgery of Station Physiologique du College de France; as well as Doctor in Medicine of the Faculte de Paris; Surgeon-in-Chief of the Russian Hospital, Paris; and Surgeon-in-Chief of the Military Hospital, Paris. Dr. Voronoff is the author of a *Treatise on Surgery, Treatise on Gynecology, Treatise on Bone Grafting, Treatise on Articulation Graft, Treatise on Ovarian Grafting, Treatise on Thyroid Grafting, Grafting of Interstitial Glands*, and *Skin Grafting*.

Vulcan, in ancient mythology, the god of fire and patron of workers in metal. Vulcan is the Roman name; Hephaestos, the Greek. He was the son of Jupiter and Juno, and was born lame, according to

some, humpbacked. Juno was ashamed of him and dropped him from the heavens into the sea, where he was rescued by the goddess Thetis, who reared him until he was nine years old, and then returned him to his parents on Mt. Olympus. Another legend runs to the effect that Jupiter, taking offense one day because Vulcan took Juno's side in a family quarrel, hurled him forth.

> From morn
> To noon he fell, from noon to dewy eve,
> A summer's day; and with the setting sun
> Dropped from the zenith, like a falling star,
> On Lemnos, the Aegean isle.

In the fall he broke his ankle, causing him to limp ever afterward. However, he set up his forge in the isle of Lemnos and became the patron of mechanic arts. Others have it that his residence was Mt. Etna, where he employed the Cyclops in forging huge thunderbolts for the use of Jove. The island of Lemnos was sacred to him. Vulcan is the protecting divinity of blacksmiths.

Vulcanite. See RUBBER.

Vulgate, a translation of the Scriptures into Latin. This translation was largely the work of St. Jerome, who, after spending his life in the study of Hebrew, Greek, and Latin, and in travel, shut himself up with companions in a monastery at Bethlehem and gave thirty-four years to writing and translating. The Vulgate was made up, in part, by adopting or revising versions of some books and by translating others from the original Hebrew and Greek. Jerome began with the Gospels in 383. He died in 420. Inasmuch as the version of Jerome differed from the versions in use, he was execrated as one tampering with the inspired word, but finally the Vulgate was adopted by the Christian church. As copies were multiplied, necessarily in manuscript, variations crept in. After the invention of printing efforts were made to issue an edition free from errors. The Clementine Vulgate, issued under the authority of Pope Clement in 1592, just a hundred years after the discovery of the New World, was declared the official Bible of the Catholic church. This put an end to the "intolerable confusion of texts." The Latin of the Vulgate is said to be colloquial—such as was used by educated people of the day rather than the classical Latin used by the authors read in college. Nevertheless the Vulgate is praised for literary quality. The first translation from the Vulgate into English was the Wyclif Bible. The next was the Douai Bible. The latter is the version used by English speaking Catholics. See BIBLE.

Vulture, a family of birds of prey. The head and neck are bare, but the lower part of the neck is surrounded by a ruff of feathers into which the head may be withdrawn partly. The beak is strong and hooked at the tip. The legs are bare to the knee. The feet and claws, unlike those of the hawk, are not adapted to seize and carry away, but to hold flesh with a trampling motion while it is torn apart by the beak. The vulture lives chiefly on dead animals. It seems to prefer putrid flesh. One of the ghastly scenes of a battlefield is the presence of vast numbers of vultures that, it is said, especially during the Thirty Years' War, learned to wait on the movements of armies. The lammergeier or lambstealer of the Alps, with feathered toes, belongs rather to a division of the falcon family, as it has seizing talons or claws. The North American representative of the vulture family is the buzzard; that of South America is the condor. The Egyptian vulture or "Pharaoh's chicken," is a small species of the eastern Mediterranean. It is a common scavenger in the towns of Syria, Egypt, and Turkey. It follows the long caravans to pick the bones of any camel that may fall by the wayside. Though not an attractive topic, the vulture is an apt subject for allusions. Sheridan speaks of "such protection as vultures give to lambs." Byron mentions the "rage of the vulture," and the greatest of Greek tragedians chains Prometheus to a rock while a Jove-sent vulture tears at his vitals daily for having stolen fire from heaven. See BUZZARD; CONDOR; PARSEES.

W

Waahoo, an Indian name applied to three different plants.

1. The burning bush. A shrub bearing bright scarlet fruit like that of the bittersweet, to which it is related. The waahoo may be told from the latter by the brighter color of its fruit and the fact that it is a bush, not a vine. The bark is an old-fashioned remedy.

2. The barberry of the Pacific Coast having medicinal properties like those of the bark of the waahoo.

3. The waahoo elm or winged elm. Its branches are ridged with corky wings. The wood is tougher than that of the white elm and is used in the South for hubs.

Wace, wäs (1115-1184), an Anglo-Norman poet. Little is known of his life, except that he was born on the Island of Jersey, was named either Robert or Richard, and received the patronage of Henry II. His important works are *Brut d'Angleterre* and *Roman de Rou.* See BRUT.

Waco, Texas, the county seat of McLennan County, is situated on the Brazos River and is served by six railroads and one interurban line. It is 97 miles southwest of Dallas and 108 miles northeast of Austin. The residential sections occupy the high ground on either side of the river, and its streets are well paved, lighted and shaded. Waco is noted for its parks, the largest of which, Cameron Park, covers nearly 400 acres.

The chief manufactures are cotton goods, cotton seed products, mattresses, harness and saddles, clothing, tents and awnings, machine shop products, flour and mill products.

Waco has the following educational institutions: Baylor University, the largest Baptist institution in the southwest, Toby's Business College, Waco Commercial College and the Academy of the Sacred Heart. Paul Quinn College and Central Texas College, two denominational schools for colored people, are also located in Waco. In addition to this, Waco has a splendid system of public schools and two modern sanitariums. The Rich Aviation Field and Camp McArthur were built here during the World War. Population, 1920, 38,500.

Wages, payment made for labor. The term is somewhat vague. As distinguished from the salary paid a manager, a clerk, a teacher, or a clergyman, and the fee of the lawyer or physician, the word carries with it the idea of manual labor. It is difficult to draw the line. We hear of a section man's wages and a railroad president's salary, but we may regard the conductor's pay as wages or as salary indifferently.

The question of what wages should be paid, especially by owners of mines, building contractors, printers, manufacturers, and all large employers of labor is a difficult one. It is natural for the workman to desire all he can get, and for the employer to pay as little as he may. Some writers have tried to show that wages are ever the least that wage earners can live upon; others, that wages are determined by the profits of the business. It is certain that laborers perish when wages are not sufficient to maintain life; and it is equally certain that when wages are so high as to eat up all the profits employers go out of business and cease to pay wages. Between these limits a constant struggle is going on. An opinion is widely prevalent that the laborer should receive a living wage and a further share of the profits, if any. Many employers maintain that a profit-sharing system of payment secures interest in the success of the enterprise in hand and obtains the best service for the wages paid.

Then, too there is the question of real and nominal wages. Real wages are to be reckoned in the quantity of the necessities of life that earnings will buy rather than in the dollars and cents of nominal wages.

After 1913 more attention was given to wages, standards of living, cost of living, etc., in the United States, England, France and almost all other European countries than had ever been given before in the history of the wage system. As one result there came to light hosts of instances in

which the worker was not receiving in real wages sufficient to maintain himself and his family decently, not to say comfortably. The correction of this deplorable condition occupied the best minds in the ranks of labor and among employers, but the question of what constituted a proper standard of living came up time after time in every country. This difficulty was occasioned principally by the difference in points of view.

Before 1900, beginning, say, in 1890, the general standard of living for working people in all civilized countries took a sharp turn upward, due partly to the natural desire for more of the comforts of life and partly to those economic factors—not to be gone into here—that drive wages upward or downward. After 1913, though standards of living in the United States may not have improved, the cost of living rose; that wages—real wages—did not keep pace with the increased cost of living is well attested. In June and July, 1920, the cost of living was 119 per cent higher than in 1913. Wages, too, were higher, but not sufficiently high to offset the rise of prices. The following table, carefully compiled, is of interest:

	Cost of Living	Wages
1913	100.0	100.0
1914	103.0	100.2
1915	107.4	103.3
1916	113.3	117.5
1917	140.5	134.4
1918	165.8	157.5
1919	190.2	185.5
1920	208.2	206.4

In England wages increased rapidly after the opening of the World War, and the same is true of many other countries. Considering the hourly wage rate in Norway as 100.0 in 1914, wages generally rose about 90 per cent by the middle of 1918; in Denmark the rise was from 100.00 in 1914 to 349.0 in 1919; the rise in Greece was from 100.0, 1914, to 305, 1920; in the same period hourly rates in Germany increased about 25 per cent. But while hourly rates thus increased, it is to be remembered in connection with the consideration of these increases that in many instances the total of weekly hours of labor was decreased, thus in part offsetting the wage increase.

The Cost of Living section of the National War Labor Board of the United States in June 1918 gave the minimum required earnings of an American family of five living in New York City as from $1,350 to $1,400 a year; by December, 1918, the figure had been raised to $1,500. But in 1918 the Bureau of Municipal Research, Philadelphia, set the minimum for that city at $1,637; in November, 1919, the figure was $1,803 and in August, 1920, $1,988. It was found in the case of the latter city that, month for month, the wages of workers in the manufacturing industries were not sufficient to support this standard.

From July, 1920, to March, 1921, wages in the United States were still increasing. Between September, 1920, and January, 1922, food prices in general decreased, but struck a rapid pace upward after the latter date; the upward trend of prices did not hold, however, and as the cost of living descended wages decreased more rapidly. In July 1921, a wage reduction of 12 per cent on 102 American railroads was ordered by the United States Railway Labor Board.

As said before, discussions of the wage question—even when based on figures as given above—turn upon the standard of living question. The workman who is satisfied with a limited education for his children and street cars as a means of transportation has one standard, while the workman who wishes to give his children university training and to own a motor car has another. In almost all countries, the wages of women are much lower than those of men, for the same work.

Wagner, Richard (1813-1883), the most celebrated musical composer of Germany. A native of Leipsic. He was educated in the musical atmosphere of Dresden and Leipsic. Wagner is the acknowledged master of the orchestra, but as to his work as a composer there is a difference of opinion. One school holds that his music is too declamatory and that it is deficient in melody. Wagnerian music includes *Rienzi, The Flying Dutchman, Tannhäuser, Lohengrin, Tristan and Isolde, The Meistersinger, The Nibelung's Ring,* and *Parsifal.*

Wagner was an incomparable man capable of managing an empire. It was the ambition of his life to substitute German music for the French and Italian music to which Germany was accustomed. He held positions of prominence in Magdeburg, Dresden, London, and Munich. Toward the close of his life he settled in Bayreuth, a provincial capital in northern Bavaria, where he organized Wagnerian festivals. A theater was built for his special use on a hill overlooking the town. He made acting prominent in grand opera. Albert Lavignac, a recent critic, writes:

> One must go to Bayreuth to appreciate the intensity of emotion which can be produced by a Wagnerian drama, religiously played, and religiously listened to, without the interruption of applause, without the "Bravo! bravo!" without calling for encores,—all strictly prohibited there; with the scenery and the stage setting precisely as the master ordained it; with the invisible orchestra, its sonorities deliciously melting into each other, *never noisy;* with the auditorium in total darkness; instead of the *foyer* of the *entr'actes,* a verdant, rolling country; instead of the prompter's bell, a brilliant fanfare, sending to the four cardinal points of the sky the principal *Leitmotiv* of the following act. All this is intoxicating; ravishing to the supreme degree.

See BAYREUTH; ORCHESTRA; TANNHÄUSER.

Wagon, a four-wheeled vehicle used for the transportation of persons or heavy articles. The wagon occupies an intermediate position between the cart and the buggy, but the lines of division are not definite. Wagon is a Scandinavian word. The corresponding English term is wain, still retained in Charles's wain, etc. In this country the commonly recognized type is the American farm wagon. It has grown out of the English wagon, a heavy, strongly built affair in which, before railroads superseded the picturesque, the carter carried produce up to London town and freight home again. British farm hauling was done and is done yet largely by means of two-wheeled carts.

The earliest American wagons were modeled on the English carter's freight wagon. The Conestoga wagon for which the Cumberland road and other highways to the west were built, and the trader's wagon, which plied on the Santa Fé trail, were heavy, wooden affairs. The wagon without a load was enough for one team to draw. From the Conestoga to start with, the American lumber wagon has been evolved. The general plan of a four-wheeled vehicle, having the fore wheels smaller than the hind pair, and their axle swiveled to the front bolster to facilitate turning, has been retained, but the utmost skill of the wagonmaker has been put forth to combine lightness and strength. It has been found that the wooden axle, strengthened by strips of metal, is lighter than iron, has equal strength, and that it is able to stand the jar and jolt of rough roads better than one made wholly of metal. The timber found most suitable for axle and wheel work is the hickory. A hickory wagon is the wagon the farmer buys if he can get it, but the clearing away of our hardwood forests and the demand for hickory vehicle stock has almost exhausted the supply. Oak, ash, and elm are used as substitutes. Birch hubs are on the market, but they are a poor substitute for old hickory.

Wagon making is an extensive industry. There are nearly 6,000,000 farms in the United States. If we take into consideration the number of wagons on these farms, the number used in other occupations, as draying, teaming, lumbering, road-making, railroad building, quarrying, and the like, and take into consideration also the average life of a wagon and the consequent necessity, not only of supplying additional wagons, but of replacing the old ones, we are prepared for the statement that large wagon factories occupy hundreds of acres of ground. The principal factories are located in the hardwood region tributary to the Ohio River and the Great Lakes. Many manufacturers confine themselves to the production of parts which they sell to others. A large number of the early wagonmakers were both wheelwrights and blacksmiths. With his apprentices or help the wagonmaker wrought both wood and metal. The owner of the modern wagon factory, the larger concerns excepted, buys his hubs, his spokes, his felloes, his skeins, and other parts ready-made. He assembles the parts, as it is called, and puts them together. In this way, as in the case of sewing machines and many other articles, different makes of wagons are likely to be much the same save

in paint and name. A feature that is receiving attention of late is the width of the tire. The wagons drawn by the mule-teams to haul borax out of the Death Valley had tires fifteen inches in width. A bulletin issued by the Mississippi Agricultural Experiment Station has this to say:

Numerous tests of the draft of wide and narrow tired wagons have been made at this station during the past two years, on macadam, gravel and dirt roads in all conditions, and on meadows, pastures and plowed fields, both wet and dry. The draft has been determined by means of a self-recording dynamometer. The net load was in every trial the same, viz., 2,000 pounds. Contrary to public expectation, in a large majority of cases the draft was materially less when tires six inches in width were used than when the tests were made with tires of standard width—1½ inches. A summary of results follows:

I. On macadam streets, as an average of the two trials made, a load of 2,518 pounds could have been hauled on the broad tires with the same draft that a load of 2,000 pounds required on the narrow tires.

II. Gravel roads. In all conditions of the gravel road, except wet and sloppy on top, the draft of the broad-tired wagon was very much less than that of the narrow-tired wagon. Averaging the six trials, a load of 2,482 pounds could be hauled on the broad tires with the same draft required for a load of 2,000 pounds on the narrow tires.

III. Dirt roads. When dry, hard and free from ruts and dust, 2,530 pounds could have been hauled on the broad tires with the same draft required for 2,000 pounds on the narrow tires. On clay road, with mud deep and drying on top and spongy underneath, a large number of tests showed uniformly favorable to the broad tire. The difference amounted to from 52 to 61 per cent, or about 3,200 pounds could have been hauled on the broad tires with the same draft required to draw 2,000 pounds on the narrow tires. In this condition of road the broad tires show to their greatest advantage. As the road dries and becomes firmer, the difference between the draft of the broad and narrow tires gradually diminishes until it reaches about 25 to 30 per cent on dry, hard, smooth dirt, gravel or macadam road, in favor of the broad tire.

A large number of tests on meadows, pastures, stubble land, corn ground and plowed ground in every condition, from dry hard, and firm to very wet and soft, show, without a single exception, a large difference in draft in favor of the broad tires. This difference ranged from 17 to 120 per cent.

Wagtail, a small, active bird noted for the activity with which it wags its tail. The name has been used with great latitude and little discrimination to include a great variety of small singing birds in all parts of the world: flycatchers, wood-warblers, and the titlarks. The term wagtail is now restricted to a single genus of several species widely distributed in the Old World. An occasional individual has been seen in America. The common wagtail of Great Britain is a small black and white pied bird of the copse. It lives on insects.

Waite, Morrison Remick (1816-1888), an American jurist, was Chief Justice of the United States Supreme Court from 1874 to 1888. He was born at Lyme, Connecticut, and was graduated from Yale University in 1837. Admitted to the bar in Maumee City, Ohio, in 1839, Justice Waite was elected to the Ohio Legislature as a Whig in 1849. He won prominence as a lawyer in Ohio, and took a leading part in founding the Republican party in 1856. Justice Waite represented the United States before the Geneva Tribunal that adjusted the *Alabama* and other claims. He was president of the Ohio constitutional convention in 1873, and in 1874 was appointed by President Grant to succeed Salmon P. Chase as Chief Justice of the Supreme Court.

As Chief Justice he was impartial, and was absolutely unbiased by political considerations. Many questions of importance came before the court during Justice Waite's incumbency, among them being the power of states to prohibit traffic in liquor, the power of the President to remove from office, polygamy cases, and especially questions of the interpretation of Constitutional amendments following the Civil War.

Wakefield, Mass., a manufacturing city, is on the western division of the Boston & Maine Railroad, 10 miles north of Boston. It is also served by several interurban electric lines. The largest industrial plants are engaged in the production of pianos, knit goods, shoes, rattan goods, stoves, iron pipe, lead lined pipe, and reed and willow furniture.

Attractive features are the municipal buildings, parks, an armory, a Y. M. C. A., and the Beebe Library housed in a beautiful new building which was a gift of the Beebe family. There is a half million dollar high school. Wakefield is the scene of the annual state and New England militia rifle tournaments. Population, 13,025.

Wake Island, a rocky islet in the Pacific midway from San Francisco to Manila. The area is one square mile. The island is a possession of the United States. It is uninhabited, and is of no importance, save that it serves as a resting spot for the Philippine cable. See UNITED STATES.

Wake Robin, or **Trillium,** a species of spring-flowering, tuberous herbs of the lily family. Erect stems, three-leaved near the flower. The flower has three green, spreading sepals and three white or colored petals, six stamens, and a three-celled pod illustrating well the plan of three in its make-up. The name is derived from the fact that they are in bloom to greet the robin shortly after his spring arrival. There are several species, all woodland flowers. Trilliums vary in size. A large form, with white to pink flowers and curved petals two to three inches long, is found from Canada to Florida, and westward to the plains. The largest of all, with purple to white petals four inches long, is found on the Pacific coast. The smallest is a dwarf three to five inches high, found from Minnesota to Pennsylvania and Kentucky. Purple trilliums are found from Idaho to Oregon and from Georgia to Alabama and Arkansas.

Walden Pond. See THOREAU.

Waldensians, or **Waldenses,** a body of reforming French Christians. They took their name from Peter Waldo, a merchant of Lyons, who became a reformer and preacher about 1170. Waldo appears to have troubled himself less with the doctrines of the church than with abuses that had crept in. Himself wealthy, he gave all that he had to the poor. He caused the four Gospels to be translated into French for the use of the common people. Later he and his followers denied the authority of the church and were driven to take refuge in the Alpine country on the border line between Italy and France. They were detested by the various popes as teachers of false doctrines and were dreaded by various monarchs as teachers of dangerous theory. At the instigation of local enemies they were subjected to horrible persecution. The tale of atrocities, the butchering of women and children, sounds more like an account of an Indian massacre than like Christian warfare. Not to mention lesser persecutions, Francis I ordered their extermination in 1541. In 1685, at the revocation of the Edict of Nantes, Louis XIV ordered them to accept Catholicism or leave. In 1689 they were able to repulse an army of 22,000 Frenchmen. From time to time influential friends were not wanting. Milton interested Cromwell in their welfare. William, Prince of Orange, interceded for them. The sect has persisted to the present day. They are Calvinists. A Presbyterian form of church government has been adopted. They are a simple people engaged chiefly in the cultivation of vineyards and the rearing of cattle. They number about 20,000. They reside within the borders of Italy but speak the French language. See ALBIGENSES.

Wales, an administrative division occupying, with England and Scotland, the island of Great Britain. Geographically, Wales comprises a peninsula lying between the Bristol Channel and the Irish Sea. It is about one hundred thirty-five miles long and from thirty-five to ninety-five miles wide. Area, 7,446 square miles, smaller than Massachusetts. The surface is mountainous. Mount Snowdon, the highest peak, attains a height of 3,571 feet. The scenery of Wales, both vale and mountain, is celebrated for beauty. Travelers even assert that Welsh scenery is the most beautiful in the world. The region is rich in mines of coal, iron, and copper. The copper works at Swansea are second only to those of Butte, Montana, in importance. The climate is moist. About thirty-five inches of rainfall may be expected yearly. Rainy harvests are the rule. For this reason, the broad valleys are suited to pasturage rather than to the raising of grain. The most characteristic manufacture is that of woolen cloth. Cardiff is the leading seaport.

The Welsh are called a Celtic people. When hordes of Saxons invaded Great Britain, the ancient Britons were absorbed or were forced back, fighting as they went, into the Highlands of Scotland, into Cornwall, and into the mountains of Wales for refuge. The Welsh are modern representatives of these Celts. It is believed, however, that the original people of Wales were Iberians, and that the Celts were absorbed by them.

The early history of Wales is a long record of fights between petty chieftains. The country was more or less united from the ninth century onward, and preserved its independence until it was subjugated finally by England in the reign of Edward I. He gave his son the title of Prince of Wales, a title since borne by the eldest son of the British sovereign. Since the Welsh conquest in 1284 Wales has been regarded as a part of England. The Welsh cling tenaciously, however, to their national dress, customs, and speech. Of a total population of 2,206, 712 in 1921, thousands of persons above three years of age spoke the Welsh language only. It is difficult for English-speaking people to spell or to pronounce the Welsh language. It is related to the Gaelic of Scotland and the Erse of Ireland, but more closely resembles the speech of the Cornishmen and the inhabitants of Brittany, France. A considerable literature exists in the Welsh language. It is noted for brilliant coloring and imagination. A number of Welsh newspapers and periodicals are published in the United States. The Methodist and Presbyterian denominations are strong among the Welsh. In the 1921 census, population of England and Wales was combined. See ENGLAND; UNITED KINGDOM.

Walhalla. See ODIN.

Walker, Sir Byron Edmund (1848-), a Canadian financier and author of several works on finance, was born in Haldimand County, Ontario. His first banking experience was gotten in the employ of an uncle, but in 1868 he entered the service of the Canadian Bank of Commerce, of which he was made general manager in 1886, director in 1906 and president in 1907. Sir Byron, while serving the Bank of Commerce, greatly extended his private financial interests and wrote a number of authoritative books. He was elected president of the Canadian Bankers' Association, president of the Canadian Institute and chairman of the governing board of Toronto University. In 1910 he was knighted. He is the author of *The Canadian System of Banking, Banking in Canada, A Canadian View of the Financial Situation in the United States* (1895), *Why Canada is Against Bi-Metallism* and *Canadian Surveys and Museums.*

Walkerville, Ontario, an industrial city, is on the Detroit River directly opposite Detroit, and on the Canadian Pacific, Pere Marquette, Grand Trunk and Wabash railroads. The city has plants for the production of automobiles, paints and varnishes, drugs, steel, wire, clothing, machines and machine tools and distillery products.

The public schools are modern, there is a collegiate institute, churches, and a beautiful Dominion building. The electric light and power system is municipally owned. In 1921 the residents numbered 7,040.

Walkingstick, a singular wingless insect allied to the mantis. In appearance it resembles a dried twig from two to six inches in length. Were it not for its legs, the observer would seldom be able to detect it, especially as it lies customarily lengthwise on twigs and the like. It feeds on leaves. No doubt its shape, aided by a greenish gray color, is a protection against bird enemies. There are many species. See MANTIS.

Wallace, Alfred Russel (1823-1913), an eminent English naturalist. He was a native of Monmouthshire. He received an academic education and was trained for the profession of surveying. While engaged as an instructor in a school at Leicester he formed a friendship with Walter Bates. Both were enthusiastic collectors of insects. In 1848 they formed the project of a trip to the valley of the Amazon. They spent four years in this region. On their return Wallace wrote a charming *Narrative of Travel on the Amazon and the Rio Negro.* The collections and reports of the two young men marked an epoch in the study of entomology. Later, Mr. Wallace was privileged to reside, travel, and collect for eight years (1854-1862) in the Malay Archipelago. The British government and the Royal Geographical Society enabled him to employ helpers. He returned with 125,660 specimens of natural history, including mammals, reptiles, birds, shells, butterflies, beetles, and other insects. His observations were published in a work of surpassing in-

terest, *The Malay Archipelago, The Land of the Orang-Utan and the Bird of Paradise: a Narrative of Travel, with Studies of Man and Nature.* His name has been perpetuated by "Wallace's Line," a term applied to an imaginary line that separates the animals and plants of Australia from those of Asia. In scientific questions Wallace and Darwin worked in harmony. In fact what are known as Darwin's theories were in part originated by Wallace. In the end Darwin's name will be associated chiefly with the origin of species; the name of Wallace with the geographical distribution of plants and animals. See DARWIN; HUXLEY.

Wallace, Lewis (1827-1905), an American soldier and author. He was born at Brookville, Indiana, April 18, 1827. He died February 15, 1905. He studied law and was admitted to the bar. He went with an Indiana regiment to the Mexican War, having the rank of lieutenant. At the opening of the Civil War he was appointed adjutant-general for Indiana. He soon afterward entered the service as a colonel. He was engaged at Fort Donelson, Shiloh, Corinth, and Monocacy, and came out of the war with the rank of major-general of volunteers. He opened a law office in 1848 and resumed practice in 1865. In 1878-81 he was governor of New Mexico. During Garfield's administration he was minister to Turkey. "Lew Wallace," as he is familiarly called, has written several popular works, including *Ben Hur: a Tale of the Christ, The Fair God,* and *The Prince of India.* His reputation rests chiefly on *Ben Hur.* It is a powerful tale that few readers can afford to overlook. Robert Ingersoll is said to have suggested the theme to Wallace. In commemoration of his services to his state and country, a statue of General Wallace was placed in Statuary Hall in the capitol at Washington January 11, 1910. It represents him as clad in the uniform of a major-general of the United States army. See SANTA FÉ; CHARIOT.

Wallace, William (1274-1305), a Scottish patriot. While he may be regarded as a historical character, one of a line of men who resisted the attempts of England to conquer Scotland, the exact facts of his life are not known. No doubt fancy and fiction have invested him with the halo usually surrounding a popular hero. So far as accounts go, Wallace was a daring leader, carrying on a species of partisan warfare like that waged by Sumter and Marion during the war of the American Revolution. He incurred mortal enmity not only for his daring, but by the murder of English dignitaries and the trouble he caused others. On one occasion he dashed into Scone and put the English court of justice to flight. At another time, at Glasgow, he routed out the English bishop of Durham who had been sent north to reorganize the Scottish church.

Among the adherents of Wallace was the great border family of Douglass. So many Scottish fortresses were recovered from the English that an army under Sir Henry Percy, the Hotspur of history, was sent north to suppress Wallace. Wallace was engaged in the siege of the Castle of Dundee, but retired and took his position in front of Stirling. Here he disposed his troops skillfully in a loop of the Forth. Percy's forces were crossing the river by a narrow bridge. When Wallace deemed that as many had crossed as he could handle easily, he threw a strong detachment forward to hold the bridge while he fell upon the advanced division. The Scottish victory was complete. The English fled in dismay. The date of this battle is given as September 11, 1297.

The following year King Edward invaded Scotland at the head of a force of 7,000 men-at-arms and 80,000 bowmen. Wallace defended himself bravely, but was defeated at Falkirk July 22, 1298. He became a fugitive and later, through English gold, was betrayed basely to the English governor of Dumbarton Castle. He was conveyed to London and tried at Westminster on a charge of treason and rebellion. He was executed in the Tower and was buried there. His two-handed sword is kept at Dumbarton Castle. The most interesting juvenile account of his exploits may be found in Jane Porter's *Scottish Chiefs.*

See BRUCE; SCOTLAND; FALKIRK.

Walla Walla, Wash., the county seat of Walla Walla County, is on the Northern Pacific and Union Pacific railroads, 200 miles south by west of Spokane. The city is the commercial headquarters of a rich agricultural region, and has manufactories of agricultural implements and machinery, including threshing machines; and of leather, artificial stone, bricks, sash and doors, flour and cigars.

Walla Walla is the seat of St. Vincent's Academy, Walla Walla College, Whitman College, St. Paul's School and Walla Walla Business College. The city has a large park, a Federal building, Carnegie library, a modern high school, St. Mary's Hospital and a Federal hospital.

In 1856 a military post was established here, and about this the city grew up. The original name was Stephen City, the present name having been adopted in 1868. Population, 1920, 15,503.

Wallenstein, wŏl'en-stīn (1583-1634), a German soldier. He was a native of Bohemia, the heir of a Protestant family of high rank. He studied with the Jesuits and was converted to Catholicism. He attended the universities of Altdorf, Bologna, and Padua. In a war with Venice he was made a count and given the rank of colonel in the Austrian army. At the outbreak of the Thirty Years' War, he was first and foremost in putting down the revolt of the Protestant Bohemians. As a reward he was permitted to enrich himself enormously with the confiscated estates of the Bohemian nobility. As the war progressed he became field-marshal of the empire and coöperated with the renowned Tilly. He overran Silesia, drove the Danes out of Germany, and fought the battle of Lützen in which Gustavus Adolphus fell. His soldiers are said to have plundered or destroyed $400,000,000 worth of property. In the meantime, so signal had been his success, he had incurred the jealousy of the Austrian nobility and had been deprived of command temporarily. The facts appear to be that his own party, the Catholics, feared his wealth, his capacity for affairs, military skill, energy, and ambition. He was suspected of designs to make himself emperor. It was suspected that he aimed to make himself master of Europe, an early Napoleon Bonaparte as it were. He was known to be in correspondence with the Protestant forces, some aver to betray them; others claim to betray the Catholic cause. At all events the emperor was induced to make proclamation removing him from command and forbidding all forces to obey his orders. Wallenstein retired haughtily to the fortress of Eger, Bohemia. Here he was assassinated by a quartette of scoundrels, two Scotchmen and two Irishmen, on the night of February 25, 1634. The emperor rewarded them publicly. Wallenstein's fidelity or otherwise to the Catholic cause is one of the fiercely disputed questions of history. Schiller made him the subject of a series of three noted plays, *Wallenstein's Camp, The Piccolomini,* and *Wallenstein's Death.*

Walloons, a people inhabiting southern and southeastern Belgium, the neighboring parts of France, and a few places in Rhenish Prussia. They are descendants of the ancient Belgae, but they are mixed with Germanic and Roman elements. The Walloon language is considered a dialect of the French. In America the name has been applied inappropriately to the Huguenot settlers in New York.

Wall Street, in New York City, a narrow street leading from Broadway to the East River. It occupies the former site of a stockade wall built across the Island of Manhattan by the burghers of New Amsterdam as a defense against the Indians. The United States subtreasury, the assay office, and a number of banks and trust offices are located on this street. As the banking business, however, has outgrown the narrow accommodations of one short street, the term has been extended to include adjacent territory. In this larger sense, Wall Street is applied to the entire financial district of New York City. It includes seven exchanges, the subtreasury, nearly forty banks, about thirty trust companies, and not less than five hundred railroad, insurance, express, telegraph, mining, and manufacturing offices that handle funds on a large scale. Wall Street is one of the two greatest financial centers in the world, ranking in the magnitude of its

operations with the corresponding financial center in London, about the Bank of England.

Walnut, a small family of important trees. There are about eight, some say ten, species, all confined to the temperate regions of the northern hemisphere. The black walnut, or walnut, as it is called, is a handsome tree growing to 100 or even 150 feet in height. It is the pride of American forests. Walnut timber was at one time used for fences and was even burned in huge log heaps to get it out of the way. It is a rich, dark wood, now commanding prohibitive prices for furniture, gunstocks, and the like. The butternut is a smaller tree, thirty to one hundred feet high. Its wood is less valuable, but is used for similar purposes. Both woods contain preservative oil and resist decay. The black walnut is found from Minnesota to Texas and eastward. The butternut is more hardy. Both trees bear oily nuts. The walnut is shorter, darker, and rougher than the butternut. How the red squirrel knows which end of the nut to gnaw a hole in, and how he can get the curiously branched meat out through one small hole are questions which puzzle boys. The bark of the butternut is used for tanning, and the husks of its nuts are used to dye homespun a yellowish brown. Northern men who sympathized with the South during the Civil War were often nicknamed "butternuts." English walnuts are a thin shelled nut, less oily, and more generally desired for table use. The English or European walnut is raised extensively in southern Europe and, of late, in California, also in the Middle Atlantic States. The California crop is worth a million dollars a year. Hickory nuts and walnuts are related closely. See NUTS.

Walpole, Horace, Earl of Orford (1717-1797), an English author. He was born in London, the fourth son of Sir Robert Walpole. After studying in Eton and Cambridge he traveled on the Continent, and in 1741 took his seat in Parliament and retained it until 1768, despite the fact that he never took any serious interest in politics. His Gothic villa at Twickenham, near London, he called Strawberry Hill. During his lifetime he was actively engaged in fitting up his home with things antiquarian. His museum and library with their antique furnishings and collections were the charm of tourists and travelers, who were admitted by ticket at certain times during the year. He established a private printing press at Strawberry Hill, and the editions of his own works which he printed were considered valuable and were in great demand. His romance, *The Castle of Otranto,* became popular and represents the first of a type of literature which had a great vogue in the years immediately succeeding its publication. The handling of a Gothic theme became one of the popular elements in the subsequent literature of the English Romantic school. He also published the *Catalogue of Royal and Noble Authors of England,* but his greatest popularity in our day rests on his *Letters,* which entitle him to the foremost rank among English letter-writers.

Walpole, Sir Robert, First Earl of Oxford, (1676-1745), an English statesman, was born at Houghton, Norfolk. He was educated at Eton and at King's College, Cambridge. Elected to Parliament for Castle Rising in 1701, Sir Robert soon became prominent in the Whig ranks. He was made Secretary of War in 1708, but went out of office with his party in 1710. Becoming one of the strongest figures of the opposition, Sir Robert incurred the bitter enmity of the Tories. They accused him of corruption, had him dismissed from the House, and even had him imprisoned. But his popularity increased; he was reelected to Parliament in 1713, and was returned to ministerial favor upon the accession of George I in 1714. He won the king's esteem with his services as Privy Councillor, Paymaster-General of the Forces, and Chancellor of the Exchequer. He resigned his office in 1717, but soon became known as one of the most vigorous enemies of the South Sea Company. Upon the failure of the South Sea venture in 1721, Sir Robert was again made Chancellor of the Exchequer and First Lord of the Treasury. In this office he proved to be one of the ablest ministers of finance England

ever had. He averted panic, established sound finance, and until 1742 was the virtual ruler of England. His policy was peace abroad and sound finance at home. When George I died, 1727, Sir Robert's enemies renewed their attacks, but George II had the wisdom not to dismiss his father's old minister. His enemies were relentless. He resigned his office in 1742, but still advised his king on many matters of state. Once again he was accused of peculation, but the charge could not be proved. He is remembered, however, as one who openly justified Parliamentary corruption as undesirable but quite necessary.

Walrus (literally whale horse), a large animal of the seal family remarkable for enormous canine teeth projecting like tusks downward from the upper jaw. For an account of its flippers and habits of breeding, see article on the SEAL. The male walrus attains a length of from ten to twelve feet, with a chest girth very nearly equal to its length. The neck is thickened to an enormous extent. Three-fourths of its total weight, which is 2,000 to 3,000 pounds, is in front of the waist line. It is the clumsiest of animals when on land. Notwithstanding the formidable appearance given by its tusks, the bull walrus is less courageous than the male fur seal of one-third its size. It uses its tusks for digging clams and other shellfish which, with seaweeds, form the entire contents of its stomach. It is not swift enough in its movements to catch fish. There are two species. The Atlantic walrus is now found on the coast of Labrador, Greenland, and in the Arctic waters north of Europe. The other species is found in the North Pacific Ocean. It was once a mainstay of the Eskimo, but now herds are few. The walrus is valuable for its ivory tusks and for the oil which is extracted from its blubber, but its fur is worthless. In fact the thick, wrinkled skin is almost hairless. See SEAL; MANATEE.

Waltham, Mass., is the home of one of the largest watch factories in the world. It is on the Charles River and on the Boston & Maine Railroad, 10 miles west of Boston. The city is built on both sides of the Charles, and is laid out with good paved and shaded streets and has several attractive public parks. It is the seat of Notre Dame Normal Training School, the Massachusetts School for the Feeble-Minded, the Waltham Training School for Nurses and the Horological School, where watch making and repairing are taught. The public library, Waltham Hospital and the Leland Home for Aged Women are notable structures.

Besides high grade watches, Waltham manufactures watch makers' tools, brass ware, sweaters, aeroplanes, pearl buttons, canoes, cotton goods, woolen yarn and sweaters.

Founded in 1640, Waltham formed a part of Watertown until 1738; in that year it was separately incorporated, and was chartered as a city in 1884. In 1920 the population was 30,915.

Walther von der Vogelweide, wäl'-ter fon der fō'gel-wī-deh. See MINNESINGERS.

Walton, Izaak (1593-1683), a quiet, easy-going London linen merchant. His delight lay in fishing, reading, and writing. He wrote a number of quaint, rambling *Lives* of the people of his time. His *Compleat Angler* is a description, usually in dialogue form, of English lanes, inns, farms, fishes, rods, bait, boating, and angling. It is a delightful volume, most artfully interwoven with observations worthy of Shakespeare himself. It is the first of outdoor books.

> Look, under that broad beech-tree I sat down, when I was last this way a-fishing; and the birds in the adjoining grove seemed to have a friendly contention with an echo, whose dead voice seemed to live in a hollow tree near to the brow of that primrose hill. There I sat viewing the silver streams glide silently towards their center, the tempestuous sea; and sometimes I beguiled time by viewing the harmless lambs, some leaping securely in the cool shade, whilst others sported themselves in the cheerful sun.

Wampum, wŏm'pŭm, a colored bead made by our Atlantic Indians by drilling holes in pieces of the interior of the round clam or quahog. It was much prized by them as an ornament. Strings of wampum were so valuable in aboriginal eyes that they were accepted gladly in exchange for other articles, and thus became their money.

Sea-bear.

Sea-lion.

Walrus.

THE WALRUS AND RELATIVES.

An article was valued at so much wampum. These shell beads were ground to a cylindrical form by rubbing them on a stone and were pierced by a flint awl, specimens of which have been found in the shell heaps of New England. Shell money was recognized by the laws of the colonists. In early days the ferryman charged so much wampum for setting the traveler across the stream. A wampum belt presented to William Penn by the Indians on the occasion of the famous Penn treaty is preserved by the Pennsylvania Historical Society. It consists of eighteen rows of white shell beads, in all, three thousand bits. Two dark figures are formed of dark bits. The two clasp hands,—one, wearing a hat, is for Penn; the other, bareheaded, represents the Indian. See SHELL; BEADS.

Wanamaker, John (1838-1922), American merchant. He was born in Philadelphia. He received an ordinary common school education. At the age of fourteen he began to acquire experience as an errand boy in a store. In 1861 he formed a partnership with a brother-in-law under the name of Wanamaker & Brown, and established a clothing store. Later the firm became known as John Wanamaker & Co. The firm added one line of goods after another until "Wanamaker's" became a feature of Philadelphia and was regarded as the most noted department store in America.

Wandering Jew. See SUE, EUGENE.

Wapiti, the North American stag or elk. The name is Indian. The wapiti is related to the European red deer. It is not considered a true elk. The adult stands about sixty-four inches high at the shoulder. The general color is yellowish, the sides are gray. Long, coarse hair drapes the neck like a dewlap, and the antlers attain a length of four or five feet. When this country was colonized the wapiti ranged from the Carolinas to the Rocky Mountains, but it is now confined to sections of Labrador and the northern half of the Rocky Mountains. During the breeding season the does scatter, but in winter the wapiti gather together in large herds and feed in the parks and on the open hills. The custom of migrating southward for winter feed has exposed the bands to destruction. See ELK.

War, The Great. The war between Germany, Austria-Hungary, Turkey and Bulgaria on one side and France, Belgium, Great Britain, Russia, Serbia, Japan, Italy, Rumania, the United States and other countries on the other side, beginning July, 1914, and continuing until November 11, 1918, was the greatest in the history of the world. Including the British colonies, twenty-seven nations were engaged in the conflict, while ten others severed diplomatic relations with Germany. 7,450,000 men were killed and a much larger number wounded.

CAUSES: The causes of this vast struggle are very difficult to locate and seem rather to have been a growth extending over a period of years fostered by extensive military preparations on the part of the chief European powers. It will not be the policy of this article to attempt to analyze the underlying causes which are so much disputed, but simply to give in chronological order some of the chief events of the struggle. The spark that ignited the magazine of European militarism was the murder of Archduke Francis Ferdinand of Austria by a Servian fanatic on June 28th, 1914.

USE OF MODERN INVENTIONS. An interesting feature of this war has been the extensive use made of modern instruments of warfare. Among these are the submarine, the aeroplane, the dirigible balloon, the floating mine, immense siege guns and gas bombs. It has been clearly demonstrated that the supposed indestructible fortifications cannot withstand the attacks of modern siege guns. The equipment that was up-to-date at the time of our Civil War would be worthless in a modern war. Possibly the two agencies that have shown the greatest development and have been used the most extensively by the combatants are the submarine and the aeroplane.

GREAT CAMPAIGNS. Only a brief reference will be made to some of the great campaigns and their results. *First,* was the German drive across Belgium almost to the gates of Paris and the counter French drive beyond the river Meuse. This netted Germany practically all of Belgium and a small slice of France. *Second,* the great Russian drive through Poland into Austria

and later the counter drive almost to the gates of Riga. *Third,* the allied expedition against Constantinople which was later abandoned with little accomplished. *Fourth,* the Austrian and Bulgarian campaign against Servia resulting in the capture of almost the entire country. *Fifth,* the Russian campaign against Turkey resulting in the capture of many points along the Black Sea. *Sixth,* the campaign of the Italians against Austria resulting in the capture of some border territory by Italy and the counter gains of Austria. *Seventh,* the great German campaign against Verdun, which failed to reduce the fort. *Eighth,* the Allies' great offensive, resulting in the capture of the Holy Land, the fall of Bulgaria and Turkey in the East, and the general and final German-Austrian retreat and the signing of the armistice.

1914

June 28.—Archduke Francis Ferdinand assassinated.

July 23.—Presentation of Austro-Hungarian note to Servia.

July 28.—War declared on Servia by Austria-Hungary.

July 30.—Partial mobilization of Russian Army. Belgrade bombarded by Austria-Hungary.

July 31.—General mobilization of Russian Army ordered. State of war declared in Germany.

Aug. 1.—War declared on Russia by Germany. Luxemburg invaded by Germany. French cabinet orders general mobilization.

Aug. 2.—German troops enter France. German ultimatum to Belgium demanding free passage for her troops. Russian troops enter Germany.

Aug. 4.—Ultimatum sent by Great Britain to Germany demanding an assurance that the neutrality of Belgium shall be respected. Germans attack Liege. Mobilization of the British Army. Germany declared war on both Belgium and France. Great Britain declared war on Germany. Mobilization of Turkish Army. President Wilson issues proclamation of neutrality.

Aug. 5.—Lord Kitchener appointed British minister of War. German mine-layer *Koenigen Luise* destroyed. First installment of British expeditionary force landed on French coast. President Wilson tenders his good offices to the warring nations.

Aug. 6.—Austria-Hungary declared war on Russia.

Aug. 7.—Mobile Belgian military force withdrew from Liege, leaving forts occupied by their permanent garrisons.

Aug. 8.—French advance into Alsace, occupying Altkirch.

Aug. 9.—German warships *Goeben* and *Breslau* took refuge in the Bosphorus. French occupy Muelhausen.

1914

Aug. 10.—France declares war on Austria-Hungary.

Aug. 12.—England declares war on Austria-Hungary. Sale of German warships *Goeben* and *Breslau* to Turkey announced.

Aug. 15.—Japanese issue ultimatum to Germany demanding evacuation of Kiauchau. Russia issues proclamation promising reconstitution and autonomy of the Kingdom of Poland.

Aug. 16.—Landing of British expeditionary force on coast of France completed. Russian advance on Germany begun.

Aug. 17.—Belgian government removed from Brussels to Antwerp. Beginning of a five days' battle in Lorraine, ending in repulse of French across frontier with heavy loss. Beginning of five days' battle between Servians and Austrians on the Jadar, ending in Austrian rout.

Aug. 20.—Brussels occupied by Germans. Belgian Army retreats to Antwerp. French reverses in Alsace.

Aug. 23.—Germans enter Namur and begin attack on Mons. Japan declares war on Germany, blockades and commences bombardment of Tsingtau. Germans destroy three of Namur forts.

Aug. 24.—Fall of Namur announced.

Aug. 25.—Louvain destroyed by Germans. German *Zeppelin* drops bombs on Antwerp. Muelhausen evacuated by French.

Aug. 28.—British fleet sinks five German warships off Helgoland.

Sept. 2.—Russians defeat Austrians at Lemberg after seven days continuous fighting.

Sept. 3.—French Government removed from Paris to Bordeaux.

Sept. 5.—Great Britain, France and Russia agree not to treat for peace separately. Rheims taken by Germans.

Sept. 7.—Germans reach extreme point of their advance in first invasion of France, and begin retreat.

Sept. 12.—German retreat halts on Aisne.

Sept. 14.—British auxiliary cruiser *Carmania* sinks German armed cruiser *Cap Trafalgar* off east coast of South America.

Sept. 16.—Russians retire from East Prussia.

Sept. 20.—Bombardment of Rheims Cathedral by Germans.

Sept. 22.—British cruisers *Aboukir, Hogue* and *Cressy* sunk by German submarine in North Sea.

Sept. 28.—Germans bombard Antwerp's first line of defence.

Oct. 5.—Belgian Government removed from Antwerp to Ostend.

Oct. 7.—Japanese seize Caroline Islands.

Oct. 9.—Germans occupy Antwerp.

Oct. 12.—Martial law declared throughout Union of South Africa on account of mutinies by Boer leaders.

Oct. 13.—Belgian Government removed from Ostend to Havre.

Oct. 15.—Ostend occupied by Germans.

Oct. 16.—British cruiser *Hawke* sunk by German submarine.

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Oct. 17.—Japanese cruiser *Takachiho* sunk by torpedo in Kiauchau Bay.

Oct. 24.—Ten days' battle before Warsaw ends in German defeat.

Oct. 27.—The *"Audacious"* one of the new British dreadnoughts, sunk by a mine off the Irish Coast.

Oct. 29.—Turkey begins war on Russia by naval attacks on Black Sea ports.

Nov. 1.—German squadron defeated British squadron off Coronel, Chile.

Nov. 5.—England and France declare war on Turkey. Dardanelles forts bombarded.

Nov. 6.—Kiauchau surrenders to Japanese.

Nov. 11.—Germans cross Yser Canal and capture Dixmude.

Nov. 13.—Russians seize Tarnow, Krosno, and Jaslo.

Nov. 21.—Russians capture Gumbinnen.

Nov. 22.—Turks gain victory over British near Port Said, east of the Suez Canal.

Nov. 23.—Beginning of second Battle of Ypres in the Argonne.

Nov. 24.—Russian victory concludes ten-day battle in Poland.

Nov. 25.—British steamer *Malachite* sunk near Havre by German submarine.

Nov. 26.—British predreadnought *Bulwark* blown up in the Thames.

Nov. 27.—French gain strongholds along line from the Channel to Muehlhausen. Bombardment of Rheims effected.

Nov. 29.—Important positions captured by Allies near Ypres. Russians seize Czernowitz.

Nov. 30.—Capture of Belgrade by Austrians ends 126-day siege.

Dec. 3.—Germans take offensive position between Ypres and Dixmude.

Dec. 5.—Allies successfully resist the German attack at Ypres.

Dec. 6.—Germans capture Lodz and threaten Warsaw.

Dec. 8.—British battleship squadron meets and destroys four German cruisers off Falkland Islands. Only one German cruiser escapes and this is pursued by the British fleet. British force captures Kurna in Turkey.

Dec. 12.—Austrians repulsed by Servians at Kosmai.

Dec. 13.—British submarine sinks Turkish battleship *Masudieh* in the Dardanelles.

Dec. 14.—Servians recapture Belgrade. Austrians capture 9,000 Russians at Dukla in the Carpathians.

Dec. 16.—The English coast towns Scarborough, Hartlepool, and Whitby are bombarded by a German squadron.

Dec. 17.—England declares protectorate over Egypt; end of Turkish suzerainty.

Dec. 18.—Germans seize Lowicz.

Dec. 19.—Battle on the Bzura halts Germans thirty miles from Warsaw.

Dec. 20.—Interior forts of the Dardanelles are bombarded by allied fleets. Germans advance farther toward Warsaw

Dec. 21.—Russians win in Armenia.

Dec. 23.—Austrians defeated in Carpathians.

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Dec. 25.—British cruisers, accompanied by hydroaeroplanes, attack German naval base at Cuxhaven.

Dec. 30.—Germans withdraw over the Bzura.

Jan. 1.—British battleship *Formidable* is torpedoed and sunk in the English Channel with severe loss.

Jan. 4.—French troops capture Steinbach in Alsace. Russians are victorious at Ardahan and Sarikamysh.

Jan. 7.—President of France issues decree prohibiting the sale and transportation of intoxicating liquors.

Jan. 9.—Germans recapture Steinbach and Burnhaupt.

Jan. 10.—Thirty bombs thrown by German aeroplanes on Dunkirk.

Jan. 14.—Germans win victory north of Soissons, forcing the French retreat across the Aisne.

Jan. 15.—Kirlibaba Pass taken by the Russians.

Jan. 19.—German airships raid English towns on Norfolk coast.

Jan. 27.—Austrians recapture Uzsok Pass.

Jan. 28.—French defeated at Craonne.

Jan. 30.—Russians win Tabriz in victory over Turks.

Feb. 1.—Germans recapture Borjimow, driving the Russians back upon Warsaw.

Feb. 4.—Germany declares waters surrounding the British Isles, except a passage north of Scotland, to be a war zone after Feb. 18.

Feb. 9.—Russians repel heavy attack of the Germans in the Carpathians.

Feb. 10.—U. S. Government protests against Germany's "war zone" decree.

Feb. 12.—Belgian coast seaports raided by thirty-four British aircraft.

Feb. 14.—German troops occupy Plock.

Feb. 16.—Forty British aviators again attack Belgium. Italy and Holland protest against "war zone" decree.

Feb. 18.—Germany declares "war zone" decree to be in effect.

Feb. 20.—American cotton-ship *Evelyn* is sunk by mine off coast of Holland.

Feb. 23.—American steamer *Carib* is sunk off the German coast.

Feb. 24.—Germans capture Przasnysz north by west of Warsaw.

Feb. 25.—Allied fleet silences all forts at entrance to the Dardanelles.

Feb. 27.—Russians recapture Przasnysz.

Mar. 2.—Russians occupy Dukla Pass.

Mar. 5.—Continued bombardment of the Dardanelles silences three more forts on the Asiatic side.

Mar. 9.—Three British merchantmen sunk by German submarines.

Mar. 11.—British take Neuve Chapelle and advance toward Lisle.

Mar. 14.—Three British warships sink the German cruiser *Dresden* near Juan Fernandez Island.

Mar. 15.—French capture trenches in vicinity of Arras.

Mar. 18.—British battleships *Irresistible* and *Ocean* and the French battleship *Bouvet* are

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sunk in the Dardanelles. The British *Inflexible* and French *Gaulois* are damaged.
Mar. 22.—Przemysl is surrendered to the Russians.
Mar. 23.—Lupkow Pass is won by the Russians.
Mar. 28.—British-African passenger-ship *Falaba* is sunk by a German submarine in St. George's Channel.
Apr. 2.—British battleship *Lord Nelson* is destroyed in the Dardanelles.
Apr. 3.—Allied fleet withdraws from the Dardanelles.
Apr. 4.—Russian army wins Smolnik near Lupkow Pass.
Apr. 5.—Russians capture Varecze Pass in the Carpathians.
Apr. 7.—Germans surrender Les Eparges to the French.
Apr. 14.—Fierce fighting rages at "Hill 60" in the vicinity of Ypres.
Apr. 17.—Russians withdraw from Tarnow in Galicia.
Apr. 19.—Germans gain in the struggle near Ypres.
Apr. 20.—British defeat the Turks in Mesopotamia. Relations between Austria and Italy become strained.
Apr. 23.—Attack by the Allies is resumed in the Dardanelles.
Apr. 26.—Russians suffer losses at Uzsok Pass.
Apr. 26.—Germans, reinforced, repulse French north of Ypres offsetting loss at Neuve Chapelle.
Apr. 28.—English and French ships suffer severe loss in the Dardanelles. The Allies establish armies on the peninsula of Gallipoli.
Apr. 29.—Germans cut the Libau-Kovno railroad in Russia.
Apr. 30.—Germans shell Dunkirk from distance of 20 miles.
May 1.—American oil-steamer *Cushing* wrecked by German aeroplane in the North Sea. American steamer *Gulflight* sunk by German submarine.
May 2.—Austrians gain heavy victory over the Russians in Tarnow.
May 5.—British lose "Hill 60" near Ypres.
May 7.—The *Lusitania* is sunk by German submarine off Kinsale, Ireland, with a loss of 1198 lives of which 120 were Americans.
May 13.—President Wilson sends *Lusitania* protest to Germany.
May 16.—British battleship *Goliath* sunk in the Dardanelles.
May 18.—German trenches captured south of Richebourg.
May 22.—Italy declares a "State of War." Troops clash on the frontier.
May 23.—French gain north of Arras.
May 24.—Italy declares war on Austria.
May 27.—British battleship *Triumph* is torpedoed in the Dardanelles.
May 28.—British auxiliary vessel *Princess Irene* is blown up at the mouth of the Thames, loss of 424 lives.
May 29.—Germany's reply to U. S. note suggests arbitration.

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May 30.—Italians force way to Trieste, and capture town of Ala.
June 1.—Zeppelin airships drop ninety bombs at the mouth of the Thames.
June 3.—Italians reduce fort near Trent. San Marino Republic (smallest independent government in the world) declares war. Przemysl retaken by Austro-German troops.
June 7.—Secretary of State Bryan resigns.
June 8.—Italians occupy Monfalcone.
June 11.—President Wilson's second *Lusitania* note to Germany made public.
June 13.—Gen. Mackensen breaks Russian line east of Przemysl.
June 22.—Austro-Germans recapture Lemberg.
July 7.—Italian armored cruiser *Amalfi* sunk by Austrian submarines.
July 8.—Germany's reply to second United States note regarding *Lusitania* handed to American Ambassador at Berlin. Last German forces in South Africa surrender to Gen. Botha. Russians surprise Austrians under Archduke Joseph Ferdinand and capture 15,000.
July 22.—President Wilson sends third *Lusitania* note to Germany.
July 31.—Austrians occupy Lublin.
Aug. 4.—British notes on blockade made public.
Aug. 5.—Germans occupy Warsaw and Ivangorod.
Aug. 1.—Teutonic forces advancing steadily on Warsaw.
Aug. 5.—Teutons occupy Warsaw and Ivangorod, but fail to envelop Russian defensive forces.
Aug. 7.—The Allies land a new army on Gallipoli peninsula.
Aug. 9.—British forces gain slight success in vicinity of Ypres.
Aug. 12.—The Germans take Siedlce, east of Warsaw.
Aug. 14.—The British transport *Royal Edward* is sunk by a submarine in the Ægean Sea with a loss of over a thousand lives.
Aug. 17.—The Germans occupy the city of Kovno. Zeppelins again raid the suburbs of London, inflicting slight damage.
Aug. 19.—The trans-atlantic liner *Arabic* is torpedoed and sunk off Fastnet; several American lives lost. The Germans occupy Novo Georgievsk.
Aug. 21.—German naval forces suffer defeat by Russian ships in an attack on Gulf of Riga
Aug. 26.—German offensive movement continues successful with the occupation of Brest-Litovsk.
Aug. 28.—The German ambassador to the United States, Count Von Bernstoff, requests delay of action on part of this government in the *Arabic* case and promises full satisfaction.
Sept. 1.—Germany gives virtual acceptance of the American contention on submarine warfare, thus averting a serious crisis with the United States.
Sept. 2.—German forces take Grodno.
Sept. 4.—Allan liner *Hesperian* sunk off Fastnet, presumably by a German submarine.
Sept. 7.—Grand Duke Nicholas is relieved of supreme command of Russian forces, the Czar assuming direct command in his stead.

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Sept. 8.—The Russians assume the offensive in Galicia and score slight success. The Germans in a new offensive in the Argonne district of France, gain over a mile of French trenches.

Sept. 9.—The recall of the Austrian ambassador, Dr. Constantin Dumba, is demanded by President Wilson. Germany delivers note to United States justifying the sinking of the *Arabic*.

Sept. 10.—A financial commission, sent to the United States by England and France, lands in New York.

Sept. 15.—The Teutonic forces occupy Pinsk.

Sept. 18.—The German advance in Russia continues and city of Vilna is taken.

Sept. 19.—Austro-German forces begin a bombardment of the Servian frontier, preparatory to their announced intention of invading Servia and opening a road to Turkey.

Sept. 24.—Greece orders mobilization of all forces.

Sept. 25.—The long-heralded Anglo-French drive commences in the Champagne district and in vicinity of Lens. The first few days of offensive movement nets about 50 square miles of territory, many prisoners and considerable war munitions.

Sept. 28.—England pledges armed support to all Balkan countries who will join the Allies.

Sept. 30.—The French make additional gains in the Champagne district.

Oct. 3.—The Allies land troops at Saloniki, Greece, with the view of aiding Servian resistance against the Teutonic forces.

Oct. 4.—Russia sends ultimatum to Bulgaria, demanding answer in 24 hours.

Oct. 5.—Ambassador Von Bernsdorff delivers note to United States, disavowing the sinking of the *Arabic* and agreeing to give reparation. This is a complete reversal of the position taken by the German government in their note of Sept. 9th.

Oct. 6.—The Greek Premier, Venizelos, resigns from the Cabinet. Austro-German forces invade Servia, while Bulgaria formally rejects the ultimatum of Russia. Allied forces commence advance into Servia. French gain slight success in Champagne. King Constantine of Greece appoints Zaimis as Premier to succeed Venizelos.

Oct. 7.—The Bulgarian port of Varna, on the Black Sea, is bombarded by Russian cruisers.

Oct. 9.—The Austro-German forces capture Belgrade after a severe bombardment of several days. Bulgaria protests to Greece against landing of Allied troops at Saloniki.

Oct. 10.—German attacks in vicinity of Loos repulsed with heavy losses. Russians driven back in Galicia.

Oct. 11.—The Teutonic invasion of Servia progresses and town of Smedereva is taken. Russian forces gain success over Austrians on Stripa River. Germans capture five miles of trenches from Russians west of Dvinsk. French gain ground in Champagne.

Oct. 12.—Austro-Germans advance south of Belgrade on line of Orient railway.

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Oct. 13.—Bulgarian army invades Servia at three points. Greece announces position for present to be one of armed neutrality.

Oct. 16.—Great Britain declares war on Bulgaria. Servia declares war on Bulgaria. Russians continue offensive at Dvinsk. German forces regain lost ground at Auberive and in Alsace. German destroyer and torpedo boat sunk by British submarine in Oer Sound.

Oct. 18.—Allies land troops at Enos, in Turkish territory. Allies take Strumitza, Bulgaria. Bulgars and Teutons making important advances in Servia.

Oct. 19.—Italy declares war on Bulgaria. Bulgarians take Vrania. Allies repulse several German attacks in France. Germans take Duona. Sir Edward Carson resigns from Cabinet.

Oct. 20.—Servian capital transferred from Nish to Prisrend. Bulgarians and Teutons make further gains in Servia. Italy resumes strong offensive against Austria.

Oct. 22.—Servians reported in serious plight. Bulgars take Komanova. French defeat attacks on west front. Teutons nearing Riga.

Oct. 23.—Italian squadron helps Allies bombard Bulgarian port of Dedeagatch on Aegean Sea. Italian land forces resume strong offensive against Austro-Hungarian lines. Servians force Bulgars back from Vrania.

Oct. 24.—Italians gain on entire front. Russian naval forces bombard Courland coast. Germans reported to have met serious defeats in Galicia.

Oct. 25.—Germans lose stronghold of "La Courtine" in Champagne. Germans advance in Servia. Allied forces meet Bulgars in southern Servia. German cruiser *Prinz Adalbert* sunk by British submarine. Austrian airmen raid Venice.

Oct. 26.—Teutonic forces seize Valjevo and Petrovac. Bulgars reported overwhelmed by Allied forces near Strumitza.

Oct. 27.—Teuton forces join Bulgars on Danube, open way to Turkey. French gain in Arras. Germans pierce Russian line at Dvinsk.

Nov. 1.—Germans take Kraguyevatz, and capture Servia's largest arsenal.

Nov. 3.—Bulgars and Germans gain in Servia. Uzice captured by Germans.

Nov. 5.—Greek King may ignore war party. Teutons drive Serbs back in north and Bulgars beat French forces in south.

Nov. 6.—Nish, the former capital of Servia, captured by Bulgarians.

Nov. 7.—Teutons drive Russians back across Stripa River. Teutons retake trenches on western front.

Nov. 9.—Italian passenger steamer *Ancona* sunk in the Mediterranean by an Austrian submarine. More than a hundred passengers killed, including several Americans.

Nov. 10.—Premier Asquith asked for additional credit of $2,000,000,000. He declared that the war was costing Great Britain $21,750,000 a day.

Nov. 12.—Russians take the offensive on the east-

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ern front. Italian passenger steamer *Firinze* sunk off the Egyptian coast by an Austrian submarine.

Nov. 14.—Austrian aviators bombard Verona and Brescia, Italy.

Nov. 15.—German war office reports the capture of 8,500 Servians. British forces make gains on the Gallipoli peninsula.

Nov. 17.—A council of British and French officials meet in Paris. The Bulgarian invading army occupies Prilep in Servia. British hospital ship *Anglia* sunk in the English Channel by a mine; about one hundred wounded soldiers drowned. It was announced that Great Britain has made or promised war loans to other countries amounting to $2,375,000,000.

Nov. 18.—It is reported that the commander on the Gallipoli peninsula favors the abandonment of the undertaking to force the Dardanelles.

Nov. 20.—Lord Kitchener confers at Athens with the Greek King.

Nov. 24.—The Greek government has yielded to the demands of the Allies that if the Allied troops are withdrawn from Servia to Greek territory they will not be disarmed and interned.

Nov. 28.—It is announced that the campaign against Servia has been brought to a close, that about one-half of the Servian army was captured and that communication had been established with Bulgaria and Turkey. The Canadian government commandeered about 15,000,000 bushels of wheat to be paid for at the last market price.

Nov. 30.—In France the class of 1917 is called for service in the spring of 1916.

Dec. 1.—Italy agrees not to consider a separate peace. Roumania gives notice that the Danube has been mined.

Dec. 2.—The Bulgarian army occupies Monastir, Servia.

Dec. 3.—The recall of Captains Boy-Ed and Von Papen, the naval and military attaches of the German Embassy is requested on account of improper activities.

Dec. 4.—The defeat and retirement of the British expedition in Mesopotamia is admitted. The Ford Peace Expedition sails from New York. A note sent to Austria in connection with the Italian steamer *Ancona* demanded that the sinking be denounced, that the submarine officials be punished, that indemnity be made for killed or injured Americans.

Dec. 6.—Russia orders the enrollment in 1916 of the class of 1917, nineteen year old youths.

Dec. 6-7.—Germans gain in Champagne district.

Dec. 7.—Austria reports the destruction of the French submarine *Fresnel.*

Dec. 13.—Berlin reports that 508 ships have been sunk since the beginning of the war by German and Austrian submarines a total tonnage of 917,819.

Dec. 14.—United States has protested to France against the removal of Germans and Austrians from American steamships by French

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warships. Bulgaria reports that the Allied armies have been driven entirely out of Servia. A new German loan of $2,500,000,000 is required, the total previously authorized being $7,500,000,000. The Greek army withdraws from Salonica and a strip of territory from the coast to the Servian frontier, leaving the Anglo-French army in control.

Dec. 17.—The French Minister of Finance states that the war is costing France $420,000,000 a month. Austria's preliminary reply to the *Ancona* note does not attach blame to submarine commanders. The German cruiser *Bremen* and a torpedo boat are destroyed by an Allied submarine.

Dec. 20.—Allied forces withdraw from portions of the Gallipoli peninsula. Russian squadron bombards the Bulgarian forts at Varna on the Black Sea.

Dec. 21.—The Irish Party in the House of Commons resists any attempt for compulsory military service. The Japanese steamer *Yasaka Mora* is sunk in the Mediterranean.

Dec. 22.—Second *Ancona* note to Austria declares the admission that the vessel was torpedoed after it was stopped is itself sufficient to fix responsibility on the submarine commander. A call is made by the British Parliament for 1,000,000 additional troops. Mr. Ford abandons the peace expedition.

Dec. 24.—British casualties up to December 9th are reported as 119,923 killed, 338,758 wounded and 69,546 missing.

Dec. 25.—King Peter of Servia arrived in Italy on an Italian warship after a flight through Albania. Russians defeat a German-Turkish force in Persia.

Dec. 29.—Austrian squadron bombarded Durazzo but is driven off by the Italians and Allies.

Dec. 30.—Austria's reply to second *Ancona* note states that ship was torpedoed an hour and a half after stopped, that the loss of life was due to panic, that the submarine commander had been punished.

Jan. 18.—Russian offensive in Galicia at an end.

Jan. 20.—Fourteen aerial combats recently reported between British and Germans.

Jan. 21.—Russia reports continual advances against the Turks.

Jan. 27.—America protests to Great Britain against interference with American mails. Britain's compulsory service bill becomes a law. French figures show French casualties since beginning of the war to be 800,000 killed, 1,400,000 wounded and 300,000 taken prisoners.

Jan. 28.—Germans make gains south of Somme.

Jan. 29.—German Zeppelins drop bombs on Paris.

Jan. 31.—German Zeppelins drop bombs over the northeastern counties of England.

Feb. 1.—British liner *Appam* brought to Hampton Roads by a German prize crew.

Feb. 4.—German Zeppelin lost in North Sea.

Feb. 7.—It is reported that there are 1,429,171 prisoners of war in Germany.

Feb. 8.—Germans make gains north of Arras, France.

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Feb. 10.—Germany and Austria announce that after Feb. 29th armed merchantmen will be treated as war vessels.

Feb. 14.—Germans take British trenches in Ypres region. British government calls for service all eligible unmarried men in England, Scotland and Wales.

Feb. 15.—Premier Asquith announces that British war costs are $25,000,000 per day. French minister reports current war expenses at $15,000,000 per day.

Feb. 16.—Settlement of the *Lusitania* case reported; Germany to "recognize" liability. Turkish fortress of Erzerum captured by Russians. Renewal pledge of Great Britain, France, and Russia not to end hostilities without the re-establishment of Belgium in independence. British report the practical conquest of the German colony of Kamerun, Africa.

Feb. 19.—Germans capture 400 yards of British trenches on the Yser Canal in Belgium.

Feb. 20.—German Zeppelin *LZ-77* destroyed by French.

Feb. 21.—German offensive at Verdun launched by 300,000 Germans under command of the Crown Prince. British House of Commons votes war credit of $2,100,000,000, the largest ever granted. British Secretary of Colonies reports that 730,000 square miles of German territory in Africa have been captured out of a total of 931,500. The Portuguese government seizes 36 German and Austrian ships interned at Lisbon.

Feb. 25.—German assaults at Verdun have gained from two to four miles over a front of 20 miles. Fort Douaumont is captured and then retaken by the French.

Feb. 27.—French cruiser Provence carrying troops in the Mediterranean sunk by a submarine; 3,100 lives are lost.

Feb. 28.—French check German advance on Verdun. Germans capture a mile of French trenches in the Champagne district.

Feb. 29.—Italy requisitions 34 German steamers interned in Italian ports.

Mar. 2.—Germans make gains at Verdun. Russians capture Bitlis in Armenia.

Mar. 6.—Germans gain at Verdun by the capture of Forges on west bank of the Meuse. British relief expedition in Mesopotamia reaches Essinn, within seven miles of Kut-el-Amara. It is announced that the British navy has been increased 1,000,000 tons since the war began.

Mar. 8.—Germany declares war on Portugal.

Mar. 9.—Norwegian boat *Silius* sunk.

Mar. 10.—German attack on Verdun centers around the town of Vaux. Germans make gains northwest of Rheims. British relief expedition obliged to retire to Tigris River for water.

Mar. 14.—The Italians make gains on the Corso plateau.

Mar. 15.—German Admiral Von Tripitz resigns. The Dutch passenger steamer *Tubitantia* is sunk off the coast of Holland. It is reported

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that 800,000 French children have been rendered fatherless by the war.

Mar. 18.—An engagement between German and French Aeroplane squadrons results in the loss of four French and three German machines. French destroyer *Renaudin* is sunk in North Sea.

Mar. 19.—Four German sea planes drop bombs on southeast coast of England; one machine is brought down.

Mar. 20.—Continued assaults at Verdun. Sixty-five Allied airships attack German aircraft station of Zeeburgge.

Mar. 21.—Russian armies engage in three violent offensive movements against Germans and Austrians: in the sector from Riga to Dvinsk, in the Narocz Lake region east of Wilna, and in the neighborhood of Czernowitz, Bukowina.

Mar. 24.—The British passenger steamer *Sussex,* carrying many American passengers, is torpedoed but remains afloat; fifty of the passengers are killed. The Entente Powers refuse to accept the proposal of Mr. Lansing, submitted on January 18th, designed to regulate the operations of submarines against merchant ships and to prevent the arming of merchant ships. Subscriptions to the fourth German war loan amount to $2,650,000,000; the total of the four loans is $9,075,000,000.

Mar. 25.—British aeroplanes attack the German airship shed in northern Schleswig, losing three of their number. Reported that on February 28th an engagement occurred in the North Sea between the armed German raider *Greif,* and the British armed merchant cruiser *Alcantara,* in which both vessels were sunk.

Mar. 27-28.—The Premiers of Great Britain, France, Italy, Belgium, and Serbia, and the Foreign Minister of Russia, together with the military leaders, meet at Paris in the most important Allied war conference held since the war began.

Mar. 28.—Great Britain upholds the seizure of securities in the mails between Holland and the United States on the ground that the securities were merchandise emanating from Germany, seized in accordance with the British policy to strike at German credit.

Mar. 30.—The Germans make further gains at Verdun. The Franco-Russian hospital ship *Portugal* is sunk by a submarine in the Black Sea, nearly 100 physicians, nurses, and members of the crew being lost.

Mar. 31.—The Germans by night assault complete their occupation of the village of Vaux, in which they obtained a foothold on March 11th. The Zeppelin airship *L-15* is destroyed by gunfire during a raid over England in which five airships participate.

Apr. 3.—Great Britain replies to the American protest regarding seizure of mails, maintaining right to examine mail sacks and confiscate packages containing contraband. The first important French counter-attack in the Verdun region results in the recovery of a part

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of the village of Vaux. German Zeppelin airships carry out the fourth raid over Great Britain in as many nights.

Apr. 6.—The Canadian Parliament is informed that the Dominion has raised 300,000 men for overseas service. The German Federal Council adopts a measure setting all timepieces ahead one hour.

Apr. 8.—At Verdun, the French are obliged to withdraw from the village of Bethincourt to straighten their lines west of the Meuse.

Apr. 10.—Germany replies to the American Government's inquiries regarding the sinking of the *Sussex;* the note denies that the vessel was sunk by a German submarine (although an unknown vessel, resembling a warship, was torpedoed at the same time and in the same neighborhood), and mentions that the sea in the vicinity was full of floating mines.

Apr. 12.—Great Britain replies to the American protest against the seizure of thirty-eight Germans, Austrians and Turks on the American steamer *China,* near Shanghai, maintaining that those seized were plotting against British authority in India.

Apr. 13.—The Dutch Navigation Board, after investigation, declares that both the *Tubantia* and the *Palembang* were torpedoed.

Apr. 15.—At Verdun, the French attack with large forces the German position at Fort Douaumont.

Apr. 16.—Turkey admits the sinking of the Russian hospital ship *Portugal* on March 30, maintaining that the vessel was without Red Cross mark and was apparently being used as a transport.

Apr. 17.—The Germans renew their assaults on Verdun, after several days' inaction, advancing in deep infantry columns in an attempt to ascend Pepper Hill.

Apr. 18.—The United States sends Germany a note regarding submarine warfare against passenger and freight-carrying vessels, declaring that unless Germany abandons its present methods, diplomatic relations will be severed; an appendix to the note sets forth "authenticated facts" which show beyond reasonable doubt that the unarmed French passenger steamer *Sussex* was torpedoed without warning by a German submarine. Trebizond, the fortified Turkish Black Sea port, is captured by Russian armies in co-operation with a fleet. The French Chamber of Deputies passes a measure advancing legal time by one hour.

Apr. 19.—The Italians capture the summit of Col di Lani, of strategical importance in the campaign against Austria. North of Ypres, the Germans carry 650 yards of British trenches.

Apr. 20.—Russian troops landed at Marseilles, France, in "a great flotilla of transports." It is stated at London that the Cabinet has reached an agreement on conscription, and that the threatened crisis has been averted.

Apr. 22.—An attempt to land arms and ammunition in Ireland, by a German auxiliary cruiser

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and a submarine, was thwarted by the British naval patrol; the auxiliary was sunk and a number of prisoners made, including Sir Roger Casement, one of the Irish Nationalist leaders, who had been in Germany since the war began. The Turks report a battle with the British at Betissa, on the Tigris on April 17-18.

Apr. 23.—Turkish forces in Egypt attack and destroy a British camp near Quatia, east of the Suez Canal, taking 300 prisoners.

Apr. 24.—A revolution breaks out in Dublin, led by armed members of the Sinn Féin society.

Apr. 28.—British and Indian troops at Kut-el-Amara, in the lower Tigris Valley, surrender to the Turkish besieging forces upon the exhaustion of their food supplies; 9,000 soldiers remained of the force estimated at 30,000. They had withstood a siege lasting nearly five months, with a relief force halted less than twenty miles away. A German attack on Russian positions south of Narocz Lake, results in the taking of 5,600 Russian prisoners. A third contingent of Russian troops arrives at Marseilles, France.

May 1.—It is officially announced that all the rebels in Dublin have surrendered, and that those in the country districts are following suit; more than 1,000 prisoners have been taken. All timepieces in Germany and Holland are set forward one hour.

May 2.—Premier Asquith announces that a Compulsory Service bill will be introduced immediately in the House of Commons; he declares that 5,000,000 men have entered the British army and navy.

May 3.—Three of the leaders of the Irish rebellion are court-martialed, convicted of treason, and shot; among them is Patrick H. Pearse, "provisional president of the republic." Augustine Birrell, Chief Secretary for Ireland in the Asquith cabinet, resigns on account of the Irish rebellion.

May 4.—Germany's reply to the American note of April 18, states that the German naval forces have been ordered not to sink merchant vessels without warning and without saving lives, unless a ship shall attempt to escape or offer assistance. Four leaders of the Irish rebellion are sentenced to death and shot. A German Zeppelin airship, scouting off the German coast, is destroyed by British warships.

May 5-6.—German artillery fire destroys French trenches on the north side of Hill 304, in the Verdun region.

May 8.—The United States replies to the German note of May 4, accepting the declaration of abandonment of the submarine war against merchant ships, but declaring that the new policy cannot be made contingent upon the result of diplomatic negotiations between the United States and England regarding rights of neutrals on the seas. A supplementary German note to the United States admits that the *Sussex* was sunk by

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error by a German submarine, and expresses sincere regret. The Germans at Verdun reach the summit of Hill 304, occupying the French trenches on the northern slope and taking 1,300 prisoners.

May 17.—Sir Roger Casement, after a preliminary hearing at London, is held for trial on a charge of high treason, for his connection with the Irish rebellion. He was convicted and executed August 3.

May 19.—The Austrians cross into Italy for the first time.

May 31.—A general engagement between the German and British North Sea Fleets is reported. The losses are variously reported as very heavy on both sides, both in ships and men.

June 6.—General Kitchener lost his life while en route to Russia, by the destruction of the cruiser Hampshire.

July 10.—Great offensive movement on the part of the Allies. Russians make continued gains. French and British gain in the Somme district. Italy gains against Austria. Germans continue Verdun campaign with some gains.

July 26.—United States protests against British "black list."

July 28.—The Allies make continued gains in the Somme region.

Aug. 9.—The Italians capture the Austrian city of Gorizia.

Aug. 17.—Russia claims that in the recent offensive against Austria they have taken 358,000 prisoners.

Aug. 27.—Italy declares war against Germany. Roumania enters the war on the side of the Allies.

Sept. 3.—British and French make further advances on the Somme. They capture during September about 117 square miles of territory.

Sept. 4.—Invasion of Roumania begun by Germans and Bulgarians.

Sept. 15.—Germans make gains in Roumania.

Sept. 25.—Zeppelins raid England.

Oct. 2.—A Roumanian invasion of Bulgaria fails.

Oct. 11.—Upon demand of the Allies the Greek Fleet and sea-coast ports are turned over to the Allies or dismantled.

Oct. 23.—Constanza, Roumania's chief sea port, captured by German allies.

Oct. 24.—French make substantial gains at Verdun.

Oct. 31.—A German submarine destroys five ships off the American coast.

Nov. 10.—Serbian army advances on Monastir, which they capture November 19.

Nov. 20.—Germans advance toward Bucharest.

Dec. 5.—German forces bombard Bucharest.

Dec. 6.—Bucharest captured.

Dec. 7.—Lloyd-George appointed premier in England.

Dec. 12.—Peace proposal by Germany and allies.

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Dec. 18.—President Wilson sends note to belligerent nations asking them to make known their peace terms and to neutral nations suggesting that they support America's action.

Dec. 28.—Germany replies to President Wilson saying a direct exchange of views would be best way to bring about peace; gives no terms.

Dec. 30.—Allies make joint reply to Germany's peace proposal rejecting it as a war maneuver.

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Jan. 10.—Allies make joint reply to President Wilson and give their peace terms.

Jan. 20.—Germany defends deportation of Belgians.

Jan. 23.—Battle between British and German destroyers in North Sea.

Jan. 31.—Ambassador Count von Bernstorff hands note to Secretary Lansing in Washington announcing the inauguration by Germany of an unrestricted submarine warfare on Feb. 1; Germany proclaims boundaries of blockade zones.

Feb. 3.—President Wilson orders that Ambassador Count von Bernstorff be handed his passports, directs the withdrawal of Ambassador James W. Gerard.

Feb. 5.—President Wilson forbids transfer of American ships to foreign registry; German ships interned at Manila seized.

Feb. 14.—Scandinavian countries protest against German sea warfare.

Feb. 18.—Entrance to New York harbor closed by steel net.

Feb. 26.—President Wilson appears before congress and asks authority to supply merchant ships with defensive arms.

Feb. 28.—The Associated Press reveals German plot to bring Mexico and Japan in alliance against the United States.

Mar. 3.—Foreign Secretary Zimmerman admits authenticity of letter to German minister to Mexico suggesting alliance against the United States.

Mar. 5.—President Wilson inaugurated for second term in office; outlines American policy for foreign relations.

Mar. 11.—Successful revolution in Russia; British capture Bagdad; Ambassador Gerard reaches Havana.

Mar. 12.—China breaks relations with Germany.

Mar. 15.—Extra session of United States senate ends; Czar Nicholas II. of Russia abdicates throne for himself and his son.

Mar. 16.—Grand Duke Michael Alexandrovitch renounces assumption of supreme power in Russia.

Mar. 17.—British take Bapaume; French take Roye.

Mar. 18.—British and French take Peronne, Chaulnes, Nesle and Noyon; make ten mile gain on seventy mile front; Germans destroy everything in abandoned territory; American ship Illinois sunk by submarine.

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Mar. 22.—America recognizes new government in Russia.

Mar. 24.—Washington announces withdrawal of Minister Brand Whitlock and American relief workers from Belgium; constitutionalist party in Russia votes for republican form of government.

Mar. 26.—British defeat large force of Turks at Gaza, Palestine; President Wilson calls into federal service 20,000 guardsmen in eighteen central states.

Mar. 30.—President Wilson and cabinet decide that war with Germany is the only honorable recourse left to the United States.

Apr. 2.—Special session of American congress opens; president in address asks that existence of a state of war with Germany be declared.

Apr. 4.—Senate passes war resolution.

Apr. 6.—House passes war resolution; president signs resolution and issues war proclamation; all American naval forces mobilized; German vessels in American ports seized; Germans blow up their auxiliary cruiser Cormoran at Guam.

Apr. 7.—Cuba declares war on Germany; Panama declares that it will assist the United States in the defense of tne Panama canal.

Apr. 8.—Austria-Hungary announces break in relations with the United States.

Apr. 9.—Canadians take Vimy ridge in great British offensive north and south of Arras; Austrian ships interned in American harbors seized; Chile announces it will remain neutral.

Apr. 10.—Brazil breaks off relations with Germany; Argentine government says it will support the United States.

Apr. 12.—Bolivia breaks with Germany.

Apr. 14.—House of representatives passes $7,000,000,000 war loan bill without opposition.

Apr. 15.—Great French offensive between Soissons and Reims begins.

Apr. 20.—"America day" in Britain; special services held in St. Paul's cathedral.

Apr. 21.—Turkey breaks off relations with the United States; Balfour mission arrives in the United States.

Apr. 24.—Joffre-Viviani French mission arrives in America. President Wilson signs big bond act.

Apr. 25.—Joffre-Viviani mission given ovation in Washington; president appoints Elihu Root head of mission to visit Russia.

Apr. 28.—Senate and house pass army draft bill; Guatemala severs relations with Germany; Secretary McAdoo announces that bond issue will be called "liberty loan of 1917."

May 5.—Great Britain joins French in asking that American troops be sent to France at once.

May 14.—Espionage bill passes senate.

May 18.—President Wilson orders the sending of a division of regulars to France under Maj.-Gen. J. J. Pershing; issues proclamation fixing June 5 as date for the registry of men eligible for service under draft law.

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May 19.—Nicaragua breaks off relations with Germany; Russian provisional government reorganized; President Wilson asks Herbert C. Hoover to take charge of food administration in America during the war.

May 24.—Rear-Admiral Wm. S. Sims appointed vice-admiral; plan of raising $100,000,000 for Red Cross announced by Henry P. Davison.

May 26.—Italians storm second Austrian line on Carso plateau.

June 2.—Root commission arrives in Russia.

June 5.—Military registration day under selective draft law in the United States; approximately 10,000,000 men registered.

June 8.—Gen. Pershing with staff and clerical force reaches London; force of 100 American aviators reach France.

June 9.—President Wilson's note to Russia outlining American war aims made public.

June 12.—King Constantine of Greece forced to abdicate.

June 13.—Gen. Pershing lands in France; German aeroplanes raid London, killing 157 persons and wounding 430.

June 22.—Belgian commission is received in the United States senate; Elihu Root speaks to large gathering in Petrograd.

June 27.—American troops arrive in France; congress of soldiers' and workmen's delegates in Russia declare against a separate peace.

June 29.—Greece severs relations with Germany and her allies.

June 30.—Russians open new offensive in Galicia; eighty-seven German ships seized in American ports.

July 4.—France celebrates July 4; American troops parade in Paris.

July 12.—Chancellor von Bethmann-Hollweg resigns.

July 14.—George Michaelis becomes German chancellor.

July 19.—Finnish diet declares for independence.

July 23.—Kerensky appeals to Russian army for support.

July 25.—Allied conference begins in Paris.

Aug. 5.—Canadians advance on Lens; Kerensky returns to office; Germans occupy Vama.

Aug. 8.—Canadian senate approves conscription.

Aug. 14.—China declares war on Germany and Austria-Hungary.

Aug. 15.—Pope's peace appeal is published.

Aug. 19.—Germans wrecking St. Quentin; British make fresh gains near Ypres; Italians begin offensive on Isonzo.

Aug. 21.—Canadians take 2,000 yards of German trenches in outskirts of Lens; Italians capture positions between Covite and Selo.

Aug. 27.—General embargo on exports, beginning Aug. 30, proclaimed by the president; full aid to Russia pledged by President Wilson; reply of United States to pope's peace note sent.

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Aug. 29.—Italians gain complete control of Bainsizza plateau.

Sept. 3.—Riga captured by the Germans.

Sept. 4 and 5.—German aeroplanes drop bombs on American hospital camp in France, killing five and wounding ten persons; Italians take Monte San Gabriele.

Sept. 8.—State department reveals aid given by Sweden in German minister's plot in Buenos Aires to cause sinking of Argentine ships.

Sept. 13.—State department reveals secret aid given by Swedish charge d'affaires in Mexico to Germany.

Sept. 14.—Premier Kerensky proclaims Russia a republic.

Sept. 21.—Secretary Lansing makes public Bernstorff note asking for money with which to bribe congress.

Oct. 7.—Uruguay severs relations with Germany.

Oct. 17.—United States transport Antilles sunk; German raiders sink two British destroyers and eight merchantmen in North Sea.

Oct. 24.—Big Austro-German drive against Italian front begun.

Oct. 27.—Austrian and German troops advance through Julian Alps; 2d Italian army defeated.

Oct. 29.—Whole Italian Isonzo line falls; Italians retreat to the Tagliamento river.

Nov. 3.—Three Americans killed, eleven wounded and eleven captured by German trench raiding party.

Nov. 9.—Gen. Armando Diaz made commander-in-chief of Italian army in place of Gen. Cadorna; Italians make stand on the Piave river; inter-allied military council formed.

Nov. 13.—Austrians cross the Piave at Zenson.

Nov. 16.—Italians flood lands near Venice to stop advance of enemy.

Nov. 18.—British take Jaffa.

Nov. 21.—British under Gen. Byng take Germans by surprise in Cambrai region, advancing five miles and taking thousands of prisoners.

Nov. 24.—Secret Russian treaties published.

Dec. 3.—London announces officially that "East Africa has been completely cleared of the enemy"; every German colony is now occupied by allied forces.

Dec. 4.—President Wilson asks congress to declare war on Austria-Hungary.

Dec. 6.—Great disaster caused at Halifax by explosion of munitions ship; United States destroyer Jacob Jones torpedoed and sunk.

Dec. 7.—Congress passes resolution declaring state of war to exist between the United States and Austria-Hungary.

Dec. 10.—Capture of Jerusalem by British under Gen. Allenby announced.

Dec. 14.—Secretary Daniels announces the formation of the allied naval council, including France, England, Italy, Japan and the United States.

Dec. 20.—Lloyd George outlines British peace terms, including restoration of national territory conquered by Germany with reparation for damage.

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Dec. 22.—Brest-Litovsk Peace Conference, attended by Representatives of Germany, Austro-Hungary, Bulgaria, Turkey and Russia.

Dec. 26.—President Wilson announces decision to take over all railways as a war measure and names Wm. G. McAdoo Director-General.

1918

Jan. 5.—Premier Lloyd George restates Great Britain's war aims, including restoration of Alsace-Lorraine to France and restoration and reparation in Belgium.

Jan. 8.—President Wilson, in addressing Congress, outlines what he believes should form the basis for a world peace, including:

I. Open covenants of peace.
II. Freedom of the seas.
III. Removal, so far as possible, of all economic barriers.
IV. Reduction, to the lowest possible point, of national armaments.
V. Impartial adjustment of all colonial claims.
VI. Evacuation of Russian territory.
VII. Evacuation of Belgium.
VIII. Evacuation and restoration of all French territory including Alsace-Lorraine.
IX. Readjustment of the Italian Frontier.
X. The greatest national freedom guaranteed Austria-Hungary for autonomous development.
XI. Evacuation of Roumania, Serbia and Montenegro.
XII. Turkish portions of the Ottoman Empire assured, but all other nations under Turkish Rule assured full opportunity for autonomous development unmolested.
XIII. Establishment of a Polish state.
XIV. Establishment of a general association of nations securing to each nation integrity of its territory.

Jan. 16.—President Wilson approves an order by Fuel Administrator Garfield to close all industries east of the Mississippi River, including Minnesota and Florida, except those producing foodstuffs, for seven days, January 17 to 25.

Also every Monday all industries closed January 28 to March 25, to save fuel.

Jan. 19.—Lenine Government dissolves the new constituent assembly.

Jan. 21.—An all-Russian Congress of Soviets replaces the Constituent assembly.

Jan. 24.—Trotzky rejects German peace terms.

Feb. 5.—The Tuscania, convoying 2,179 American troops, is torpedoed and sunk off the Irish coast, 159 lives lost.

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Feb. 9.—Ukraine signs a separate peace with the central powers.
Feb. 13.—Fuel Administrator Garfield suspends "Heatless Mondays."
Feb. 19.—Lenine and Trotzky announce that Russia is forced to sign the Berlin peace terms.
Feb. 23.—Germany makes another offer of peace to Russia.
Mar. 3.—The Russian delegates sign German Peace Treaty.
Mar. 7.—Senate (74 to 3) passes bill authorizing the extension of credit, not exceeding $4,000,000,000, to corporations and firms occupied in war industries.
Mar. 18.—The Supreme War Council of the Allies repudiates German treatment of Russia and Roumania and refuses to acknowledge their peace treaties with Germany.
Mar. 20.—President Wilson authorizes seizure of all Dutch ships in United States waters.
Mar. 21.—The Germans launch a terrific drive against the Western front, involving 1,250,000 troops.
Mar. 23.—Lloyd George appeals for American troops. United States purchases twelve Japanese ships.
Mar. 29.—Ferdinand Foch made Generalissimo of Allies.
Apr. 2.—United States completes loans to Allies, aggregating $5,160,600,000.
Apr. 3.—Austria proposes peace terms. Admits France has just claim to Alsace-Lorraine.
Apr. 9.—President Wilson condemns Germany's Peace Treaties forced upon Russia and Roumania.
Apr. 10.—Russian Commissioner of Commerce states German treaty takes from Russia 300,000 square miles of territory and 56,000,000 people.
Apr. 16.—Bolo Pasha executed as a traitor to France.
Apr. 22.—British naval forces block harbor of submarine base at Zeebrugge.
May 1.—Sevastopol is occupied by Germans.
May 4.—The 3rd Liberty Loan campaign closes with $4,170,000,000 subscribed.
May 6.—Roumania signs Treaty of Peace with the four Central Powers.
May 17.—The British Government arrests alleged plotters of revolt in Ireland.
May 20.—China and Japan reported to have consummated treaty for joint military operations in Siberia.
May 24.—Mexico severs diplomatic relations with Cuba.
May 25.—German submarines sink nineteen ships off New England coast.
May 27.—Great German offensive is resumed.
June 1.—German armies halted.
June 12.—German war loan subscriptions for $3,750,000,000 announced.
June 13.—Austria renews attack on Italian front. Exchange of 160,000 French and German prisoners.

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June 18.—British House of Commons votes war credit of $2,500,000,000.
June 20.—Flooded Piave endangers Austrian troops; Italians begin counter offensive, forcing withdrawal of Austrian troops.
June 24.—British treaty providing for drafting into the armies of American citizens residing in England and vice versa.
June 26.—Italian official statement places Austrian losses at 200,000. Canadian Hospital ship "Llondoven Castle" torpedoed with only twenty-four survivors of two hundred fifty-eight persons on board.
July 4.—New Provisional Government of Siberia established at Vladivostok by Czecho-Slovaks.
July 5.—House of Representatives by a vote of 221 to 4 authorizes President Wilson to take over telephone and telegraph systems.
July 6.—Italians drive Austrians from Coastal Zone.
July 15.—German drive towards Paris renewed. Haiti declares war on Germany.
July 18.—French and American forces launch counter attack on western front.
July 19.—Honduras declares war against Germany.
July 21.—French and American troops enter Chateau-Thierry.
July 30.—German Commander Von Eichhorn assassinated in Russia.
July 31.—Ukrainia and Roumania reach agreement on territory.
Aug. 2.—Allied troops land at Archangel.
Aug. 4.—American troops enter Fismes. Allies gain 25 miles.
Aug. 8.—New drive begun against Germans.
Aug. 17.—General March announces 1,450,000 American soldiers are in France, Italy and Russia and 1,550,000 troops in training camps.
Aug. 20.—Allied troops strike Germans in Noyon sector for four mile gain, beginning a big drive.
Aug. 22.—Spain notifies Germany she will substitute German interned ships to replace Spanish ships sunk by German submarines. Allies advance in Siberia fifteen miles.
Aug. 25.—Allies prevent Gen. Horvath from establishing a personal military dictatorship in Siberia and Manchuria.
Aug. 27.—Three treaties supplementing the Brest-Litovsk agreement signed at Berlin.
Aug. 28.—Washington announces capture of 112,000 prisoners and 1,300 guns for July.
Aug. 29.—Lenine, Bolshevist leader, is shot and seriously wounded.
Aug. 31.—President Wilson signs draft bill, to include all men 18 to 46.
Sept. 1-2.—Allied troops penetrate Drocourt-Queant line.
Sept. 3.—United States recognizes Czecho-Slovaks.
Sept. 5.—Peru surrenders German interned ships at Callao by agreement with the United States.

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Sept. 6.—Japanese troops occupy Kharbarovsh on the Trans-Siberian Railway.

Sept. 10.—Allies reach the Hindenburg line.

Sept. 12.—American troops capture the St. Mihiel salient, including 15,000 prisoners.

Sept. 12.—Thirteen million men, 18 to 46, register.

Sept. 14.—United States shows Trotzky and Lenine were paid $13,000,000 by Germany to betray Russia. Austria invites all belligerent governments to enter peace negotiations, in a neutral country.

Sept. 15.—Serbian and French troops capture 4,000 Bulgarian prisoners. Germany offers peace to Belgium.

Sept. 16.—President Wilson declines to discuss the peace proposal of Austria.

Sept. 18.—British and French capture 10,000 prisoners.

Sept. 19.—$8,000,000,000 tax recommended by McAdoo.

Sept. 20.—British, French and Arabs defeat Turks in Palestine.

Sept. 23-24.—British capture 50,000 Turks and 265 guns.

Sept. 26.—French-American drive breaks German line on 40-mile front between Rheims and Verdun. Bulgaria asks for armistice.

Sept. 27.—President Wilson announces "No bargain peace."

Sept. 28.—Allies announce one hundred thousand prisoners and nine hundred guns for week. Americans take 8,000 prisoners in Argonne.

Sept. 30.—Bulgaria surrenders, armistice signed. Japanese take 15,000 escaped Teutons.

Oct. 1.—Germans said to have placed 250,000 men in Sofia to hold Eastern Railway open. British capture Damascus with 7,000 Turks.

Oct. 2.—Allies smash German line between Cambrai and St. Quentin.

Oct. 3.—General German retreat from Hindenburg line. Allies take 254,000 prisoners, 36,669 cannon and 23,000 machine guns July 18 to September 30 on west front. Germans order civilians to quit Alsace. Maximilian of Baden appointed German Chancellor. Sofia-Constantinople Railway line cut.

Oct. 4.—Coalition cabinet to rule Germany. Allied naval attack destroys Austrian sea base at Durazzo.

Oct. 5.—New peace plea by Austria. Gains on all fronts by the Allies.

Oct. 6.—Central Powers reported ready to negotiate peace on terms outlined by President Wilson in his speeches. No truce while Central Powers occupy a foot of conquered territory is reply.

Oct. 7.—In answer to request of Kaiser for peace parley and urgent demand for immediate armistice to arrange peace, declaring Germany's acceptance of Wilson demands as basis for peace parley, Great Britain demands surrender of 500 criminals, including Kaiser.

Oct. 8.—United States and Allies reject peace

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plea of Central Powers, as insincere. Allies break through western lines for general advance.

Oct. 9.—Twenty-mile gap torn in Hindenburg line. President Wilson asks: "Do'you accept United States demands in full? Does demand come from German people?"

Oct. 10.—Germany must yield all gains or admit deceit. Great Allied victory following fall of Cambrai and St. Quentin.

Oct. 11.—Berlin says nation backs peace plea, while wholesale burning of defenseless towns and cities marks the retreat of the German armies, murderous attacks of the submarines continue, and the enslaving of conquered peoples is general.

Oct. 12.—Germany notifies President Wilson that Germany and Austria accept, unconditionally, the peace program of President Wilson, including the vacation of all occupied territory, and that the chancellor's demand for an armistice represents the German Government and the German people.

Oct. 15.—President Wilson's reply of October 14 published, advising that the process of evacuation and the conditions of an armistice must be dictated by the United States and her allies, providing satisfactory safeguards and guarantees of the maintenance of the present military supremacy of the United States and allies in the field, that no armistice will be considered until all the illegal and inhuman practices of Germany's armed forces on land and sea are discontinued. The President calls the attention of the Germent Government to the plain intent of one of the terms of peace which the German Government has now accepted, as voiced in the President's Mount Vernon speech of July 1, namely: the destruction or reduction to virtual impotency of every arbitrary power that can separately, secretly, and of its single choice disturb the peace of the world. United States and the Allied Armies will dictate any truce which is interpreted to mean unconditional surrender by the Central Powers.

Oct. 16.—German retreat from Belgium continues.

Oct. 17.—Belgians enter Bruges and Zeebrugge. British occupy Ostend, Lille and Douai.

Oct. 18 22.—Advance of Allies general.

Oct. 23.—President Wilson sends note to Germany demanding dictated peace.

Oct. 24.—Americans advance east of the Meuse.

Oct. 25-26.—New allied advance on Italian front successful.

Oct. 27-30.—Italians force Austrians back at all points, inflicting heavy losses.

Oct. 31.—Turkey collapses and makes full surrender.

Nov. 1.—Terms for Armistice given Austria. New American drive east of the Argonne.

Nov. 2.—British capture Valenciennes.

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Nov. 3.—German retreat general and the whole Austrian front smashed.

Nov. 4.—Austria accepts Armistice offer and drops out of the war. Americans reach Stenay in advance toward Sedan.

Nov. 6.—Germans abandon Ghent and the Americans enter Sedan.

Nov. 8.—Envoys from Berlin reach General Foch's headquarters and receive Armistice terms with limit of acceptance 11 A. M., November 11.

Nov. 9.—Bavaria deposes king, setting up a republic. Abdication of kaiser and crown prince announced, Ebert becoming chancellor.

Nov. 10.—Emperor Wilhelm takes refuge in Holland.

Nov. 11.—German envoys sign Armistice terms and fighting ceases at 11 o'clock, in general rejoicing and enthusiastic celebrations throughout the Allied countries.

Nov. 12.—Emperor Charles of Austria abdicates.

Nov. 15.—Representatives of Allied governments hold conference preliminary to peace conference in Paris.

Nov. 17.—Upon invitation of Premier Clemenceau, President Wilson announces that he will attend the peace conference.

Nov. 20-21.—Germany surrenders the greater part of its high-seas fleet and submarines.

Nov. 23.—American Army of Occupation crosses into Germany.

Nov. 27.—Announcement of names of American representatives to peace conference.

Dec. 4.—President Wilson and other members of the peace delegation sail for France.

Dec. 6.—British troops occupy Cologne.

Dec. 8.—American troops establish themselves in Coblenz.

Dec. 10.—The French division of the Army of Occupation reaches Mayence. It is officially announced that 2,079,880 American troops were transported to France.

Dec. 13.—The Americans cross the Rhine and occupy the 19-mile zone. President Wilson lands at Brest.

Dec. 25.—American troops to the number of 10,000 are reviewed by President Wilson at Chaumont.

Dec. 26-31.—President Wilson visits England.

Jan. 1.—Rome entertains the President of the United States with great enthusiasm.

Jan. 12.—The supreme war council begins actual consideration of the peace settlement.

Jan. 18.—Peace conference opens its formal sessions.

Jan. 19.—Regulations governing conference are adopted.

Jan. 25.—The conference in full session declares for a League of Nations with commissions appointed to work out the details.

Feb. 3.—The League of Nations with President Wilson presiding, holds its first meeting.

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Feb. 14.—Draft of constitution for League of Nations read and explained to conference by President Wilson.

Feb. 15.—President Wilson leaves France for America.

Feb. 16.—The time limit for the Armistice is extended.

Mar. 10.—Supreme War Council agrees on terms of German disarmament.

Mar. 14.—Upon the return of President Wilson, peace conference begins consideration of the recommendations of the various committees.

Mar. 24.—Chief problems of the conference pass to a council of four—President Wilson, Lloyd George, Clemenceau, and Orlando.

Apr. 10.—The League of Nations commission after plea of President Wilson adopts a section, exempting existing understandings like the Monroe Doctrine.

Apr. 11.—The peace conference assembles in full session for a completion of its work.

Apr. 20-24.—Controversy over claims of Italians and Jugo-Slavs to the Adriatic Coast continues.

Apr. 28.—Revised covenant of the League presented to the full conference.

May 1.—German plenipotentiaries to the peace conference present their credentials.

May 5.—The organizing committee of the League of Nations holds its first meeting.

May 7.—Treaty of peace framed by the 27 allied and associated powers is handed to the German envoys at Versailles.

May 29.—The German delegation submits written observations on the treaty.

June 16.—Revised terms of peace handed the head of German delegation.

June 22.—The German National Assembly authorizes signing of peace treaty, 237 to 138.

June 28.—The treaty of peace signed at Versailles

Sept. 10—Treaty of Peace between Austria-Hungary and the Allies and United States signed.

1920

Jan. 10—Final ratification of the German peace treaty.

NATIONS DIRECTLY INVOLVED

Germany	vs.	United States
Austria-Hungary		Great Britain
Turkey		Canada
Bulgaria		India
		Australia
		New Zealand
		South Africa
		France
		Russia
		Belgium
		Serbia
		Montenegro
		Japan
		Italy
		Roumania
		Portugal
		Cuba
		Panama
		Greece
		Liberia
		China
		San Marino
		Siam
		Brazil
		Bolivia
		Nicaragua
		Hayti
		Honduras

UNITED STATES IN THE WAR. A declaration of war against Germany was passed by the Senate, April 4, 1917, and by the House, April 6. The immediate causes were: various aggressions on part of the German Imperial Government, including the sinking of several American merchant ships by German submarines; the underhanded activities of members of the German diplomatic corps accredited to the United States in spreading dissension throughout the country, and the declaration of the Kaiser that after February 1, 1917, all neutral and enemy vessels encountered anywhere on the seas would be sunk without warning. Immediately upon receipt of this notice by the Department of State, President Wilson ordered that the German Ambassador, Count von Bernstoff, be handed his passports, and the American ambassador at Berlin was recalled.

Steps were taken immediately to increase the size of the army and navy, and to provide the necessary munitions and supplies. A registration of all male citizens between 21 and 31 years of age was ordered for June 5, and about 10,000,000 men registered.

From this list selections were made for the new army. Sixteen training camps were established for drilling the national guard and sixteen others for training the men selected by conscription. Eighteen great aviation fields were also established, 600,000 selected men were sent to the training camps in September. Before the close of 1917, the United States was prepared to send more troops to France than the supply transports could carry. By October of that year, the first troops were prepared to take positions at the front.

Major-General John J. Pershing was appointed commander-in-chief of the American forces to be sent to France and he and his staff with the first contingent of troops reached France, June 27. In May, 1918, by a second registration, Congress provided for an army of 3,000,000 to 5,000,000 men, should a force of that size be necessary.

BATTLES IN WHICH AMERICAN TROOPS WERE PROMINENT. American forces prepared for the front rapidly and over 1,000,000 men were ready to meet the enemy when the great German drive began in March, 1918.

Cantigny. On April 26, 1918, the 1st Division, went into line near Montdidier on the Picardy battle front. On May 28, this division attacked and carried a German position on the front line, capturing and holding the town of Cantigny against strong counter attacks and a galling artillery fire.

Chateau Thierry. In May the Germans launched a second drive nearly as powerful as that in March, and they advanced within thirty miles of Paris before the drive was stopped. On May 30, the 5th and 6th regiments and the 6th machine gun battallion of the American Marines were ordered to the front near Chateau Thierry. On June 5, they were attacked by some of the best troops in the German army, who expected an easy victory. But the excellent markmanship of the Americans, combined with their machine gun fire and the efficiency of their artillery, stopped the German advance and drove the enemy to cover. This battle checked the drive on Paris.

Belleau Wood. The Germans had planted machine guns in a forest near the field of Chateau Thierry and the victory of that battle would not be secure until these guns were captured. This task was assigned to the marines and after a struggle lasting several days the Germans were driven from the wood. The marines fought so valiantly that the French government rechristened the spot the "Wood of the American Marines." These American victories are considered the turning point of the War.

Saint Mihiel. Following the second Battle of the Marne, the First American Army was organized under the direct command of General Pershing. This army took over about forty miles of the front, extending from a point near St. Mihiel to the Moselle River. On September 12, after several hours of galling artillery fire, the American forces moved upon the enemy's defense about St. Mihiel, sweeping in wave after wave over the works; 16,000

prisoners, 443 guns and large quantities of material were captured. The inhabitants of many villages were released from German domination and the way to Metz was opened.

Argonne Forest. After the fall of St. Mihiel, the American First Army began a movement against the railroad communications of the German army between Mesieres and Sedan. The movement was stubbornly resisted and continued until the signing of the Armistice, November 11. The portion of the line occupied by the Americans included the Argonne Forest. This line was to cooperate with the French troops under General Gouraud, whose line extended from Rheims to the junction with the American Army in the Argonne. Both commanders were to attack the Germans at the same time. On September 25, a heavy cannonade was opened, and the following day the Americans advanced their line seven miles, but they met with strong resistance. The fighting continued until October 16, when the Americans had cleared the forest of the enemy. As the Americans made their way up the east side of the Argonne, the French advanced up the western side and the two armies met October 10, along the northern border of the forest.

The final advance along the Meuse-Argonne line began November 1, and the American and French troops moved steadily forward until they had cut the enemy's main line of communication, when further fighting was halted by the armistice.

Work of the Navy. A fleet under the command of Vice-Admiral Sims was sent across the Atlantic to cooperate with the British fleet. The fleet included a large number of submarine chasers and a strong aviation corps, and these divisions maintained so complete a patrol from Spain to the English channel that for the last six months of the war not a vessel was sunk in these waters within fifty miles of the French coast. Another detachment cooperated with the British fleet in the Mediterranean and took a prominent part in the destruction of the Austrian naval base at Durazzo. Battleships convoyed the transports that carried the American troops to France and these transports were officered, manned and operated by the Navy.

A number of naval training stations were established to prepare the newly enlisted men for their duties. The station at Great Lakes, Illinois, thirty-five miles north of Chicago, is the largest in the world.

In 1920 the navy comprised the following ships:

Battleships	39
Armored Cruisers	8
Cruisers, first class	4
Cruisers, second class	4
Coast Torpedo Vessels	15
Torpedo Boats	17
Submarines	79
Gunboats	37
Submarine Chasers	300

In addition to these there are supply ships, tugs, hospital ships, transports and ships of special types, all of which serve in an auxiliary capacity. See Navy.

Decorations. The Croix de Guerre, French for "Cross of War," was instituted by the French government at the beginning of the War to commemorate special acts of bravery. It was conferred upon military men of the armies on land or sea, whether French or foreigners, for citations for bravery. Civilians and members of the military force not in the field also received the cross if they obtained a citation.

The United States have two decorations —the distinguished service medal, and the distinguished service cross. The cross is awarded for special deeds of valor on the field only, and corresponds to the French Croix de Guerre, but it might be conferred on the men and women. The medal was awarded to any man or woman serving in any capacity who specially distinguished himself or herself in meritorius service to the government.

Liberty Loans. To meet the enormous expenses of the war, income taxes were increased. Some internal revenue taxes were more than doubled and special taxes were levied on many commodities. Five series of bonds totalling $19,000,000 were offered the public, and each was heavily over-subscribed. The first four series were styled *Liberty Bonds* and the last, the *Victory Loan*. All these loans were exempt from taxes and bore a low rate of interest.

Blackburnian Warbler
Yellow Warbler
Redstart
Prairie Warbler
Black and White Warbler
Canadian Warbler
Oven-bird
Maryland Yellow-throat

SONGSTERS

DECLARATIONS OF WAR

Austria-Hungary vs. Serbia	July 28, 1914
Germany vs. Russia	Aug. 1, 1914
Germany vs. France	Aug. 3, 1914
Germany vs. Belgium	Aug. 4, 1914
Great Britain vs. Germany	Aug. 4, 1914
France vs. Germany	Aug. 4, 1914
Austria-Hungary vs. Russia	Aug. 6, 1914
Montenegro vs. Austria-Hungary	Aug. 7, 1914
Montenegro vs. Germany	Aug. 9, 1914
Serbia vs. Germany	Aug. 9, 1914
France vs. Austria-Hungary	Aug. 10, 1914
Great Britain vs. Austria-Hungary	Aug. 12, 1914
Japan vs. Germany	Aug. 23, 1914
Austria-Hungary vs. Japan	Aug. 27, 1914
Austria-Hungary vs. Belgium	Aug. 28, 1914
Turkey vs. Russia*	Oct. 29, 1914
Russia vs. Turkey	Nov. 3, 1914
France vs. Turkey	Nov. 5, 1914
Great Britain vs. Turkey	Nov. 5, 1914
Italy vs. Austria-Hungary	May 23, 1915
San Marino vs. Austria-Hungary	June 3, 1915
Bulgaria vs. Serbia	Oct. 13, 1915
Great Britain vs. Bulgaria	Oct. 15, 1915
France vs. Bulgaria	Oct. 16, 1915
Russia vs. Bulgaria	Oct. 19, 1915
Italy vs. Bulgaria	Oct. 19, 1915
Germany vs. Portugal	Mar. 8, 1916
Austria-Hungary vs. Portugal	Mar. 15, 1916
Roumania vs. Austria-Hungary	Aug. 27, 1916
Italy vs. Germany	Aug. 28, 1916
Germany vs. Roumania	Aug. 28, 1916
Bulgaria vs. Roumania	Sept. 1, 1916
Turkey vs. Roumania	Aug. 30, 1916
Greece (Venizelist) vs. Germany	Nov. 25, 1916
Greece (Venizelist) vs. Bulgaria	Nov. 25, 1916
United States vs. Germany†	Apr. 6, 1917
Cuba vs. Germany	Apr. 7, 1917
Panama vs. Germany	Apr. 7, 1917
Greece vs. Germany‡	June 28, 1917
Greece vs. Austria-Hungary‡	June 28, 1917
Greece vs. Bulgaria‡	June 28, 1917
Greece vs. Turkey‡	June 28, 1917
Siam vs. Germany	July 22, 1917
Siam vs. Austria-Hungary	July 22, 1917
Liberia vs. Germany	Aug. 4, 1917
China vs. Germany	Aug. 14, 1917
China vs. Austria-Hungary	Aug. 14, 1917
Brazil vs. Germany	Oct. 26, 1917
United States vs. Austria-Hungary†	Dec. 7, 1917
Panama vs. Austria-Hungary	Dec. 10, 1917
Bolivia vs. Germany	Apr. 12, 1918
Nicaragua vs. Germany	May 19, 1918
Hayti vs. Germany	July 15, 1918
Honduras vs. Germany	July 19, 1918

PEACE TREATIES SIGNED

Ukraine with the Central Powers	Feb. 9, 1918
Russia with the Central Powers	Mar. 3, 1918
Roumania with the Cent. Powers	May 6, 1918
Germany with Allies and U. S.	June 28, 1919
Austria-Hungary with Allies and U. S.	Sept. 10, 1919
Bulgaria with France and her Allies	Nov. 27, 1919
Germany treaty ratified (except by U. S.)	Jan. 10, 1920

Warbeck, Perkins, a pretender to the English crown. He was born in Flanders, it is thought, the son of a Jew. He became attached to the court of the Duchess of Burgundy, where he was taught to represent Richard, Duke of York, one of the lads whom King Richard is accused of having caused to be murdered in the Tower. Warbeck was encouraged in his pretensions by Charles VIII of France and by the Scotch. He made an unsuccessful landing in Kent in 1495 and invaded England by way of Scotland in 1496. In 1497, using Ireland as a basis, he landed in Cornwall but was captured and confined in the Tower. He was tried for high treason and was hanged at Tyburn in 1499. Warbeck has been made the subject of several tragedies, the most important being presented in 1633 under the title of *The Chronicle History of Perkin Warbeck.*

Warbler, an American family of small woodland songsters. Some seventy species nest in the United States and Canada. There are about 155 species in the two Americas. Some idea of the diversity of color may be had from an enumeration of the colors prevailing on the backs of various species: greenish yellow, olive, olive green, bluish gray, grayish blue, blue, black, black and white, yellow, and ashy. Each describable spot of the warbler's plumage, as crown, throat, breast, wing, and tail, requires a similar and even longer list of colors for the different species, but olive colors predominate. Some warblers flit about with a quick wing in the tree-tops, snatching insects from twigs and leaves; others dash after insects on the wing like a flycatcher; others again search the bark of trees patiently like vireos and creepers. Among the noticeable species that pass northward in the springtime to summer homes in Canada are the yellow warbler with olive tinged back; the gray myrtle warbler with black sides and yellow crown; blackburnian warblers with flaming orange throat; and many others to which the best guide is a copy of Chapman's *Manual* and a file of *Bird Lore.* The volume of the latter for 1905 contains a series of colored plates invaluable to the student of this difficult family of birds. The Old World warblers are a distinct family.

War Department, the executive branch of the United States Government which exercises control over affairs of the army except in the matter of legislation in its behalf. The Department was created by act of Congress in 1789, and until 1798 had charge of the navy. The Secretary of War is at the head of the Department and a member of the President's cabinet. He is aided by an assistant secretary and a number of other officials. The actual management of the army is in the hands of a general staff consisting of military officers of high rank. (See ARMY subhead *Army of the United States.*) The Secretary of War has charge of the United States Military Academy at West Point and the military parks and cemeteries at Arlington, Chickamaugua, Gettysburg and other places.

War of 1812, a war fought between Great Britain and the United States. Because the colonies had won free from the mother country and were on their way to becoming a world power, England was hostile. In 1806 she was busy defending herself against Napoleon, and a part of her defense was a blockade from Brest, France, to the mouth of the Elbe River. This seriously affected American shipping, but what was worse was the English order to the effect that all neutral ships sailing to France should first call at a British port and pay a duty on its cargo and must submit to search at sea to determine whether it carried war supplies.

Britain's high handedness was carried even further: American ships were seized a few miles out of port, searched, and in many cases robbed of men supposed to be British subjects; these were pressed into British naval service. In 1807 an American vessel was fired upon; some of her crew were killed and others were taken prisoners.

In the meantime a spirited group headed by Thomas Jefferson had gained political power in the United States, and preparations for war were made. The army was enlarged, militia units were raised and naval expansion was begun. But the party favoring war was not without opponents. An embargo was placed upon American shipping, but against this the New England states protested vigorously, saying to Congress that the order would cripple the industrial machinery of the nation. England promised to revoke the orders in council that were injuring American shipping, but the promise was not kept.

The United States was really poorly prepared for war. The army numbered only about 10,000 men, and the navy had a total of only 15 ships to confront Britain's powerful navy. Nevertheless, war was declared on June 18, 1812. Hull made an effort to invade Canada, but was repulsed and his force reduced from 1,800 to 800 men, and in general the American land forces met with serious reverses.

But on the sea the diminutive navy won a number of battles early in the war and continued its successes until hostilities ceased. Perry's victory on the Great Lakes in the second year of the war was the most brilliant achievement of the conflict. (See PERRY, OLIVER HAZARD).

In 1814 Britain had more troops to send across the Atlantic, and the northern border again became the chief seat of war. In September, 1814, however, the American fleet decisively defeated the British fleet on Lake Champlain, and the British land force withdrew to Canada.

In the south, events took a more serious turn. The British fleet landed 5,000 men at the head of Chesapeake Bay. Under General Ross, this force marched on the capital. The city capitulated, and the Capitol, Executive Mansion and other buildings were burned and the members of the government were forced to take refuge in Virginia. A treaty of peace was signed at Ghent, Belgium, on December 24, 1814; but news of this was so long in reaching America that a series of sanguine battles was fought at New Orleans between December 31 and January 8, resulting in heavy losses for the British.

THE TREATY. American and British representatives met in Ghent, Belgium, in 1813, to lay the basis of a lasting peace. Discussion continued for about eighteen months, the final articles providing for the restoration of the territory taken by each side, and for the appointment of a commission to settle the question of the Canadian-American boundary.

It was thought by many that one of the most serious questions that would come up for settlement would have to do with England's having taken American sailors from American ships to impress them into service against Napoleon. But of this act of England's no mention was made, and the treaty was concluded as indicated above.

Ward, Elizabeth Stuart Phelps (1844-1911), an American poet and novelist. She was the daughter of Austin Phelps and was married in 1888 to Herbert D. Ward. Her first work was *The Gates Ajar,* published in 1868. It attracted wide attention, and is believed to have had considerable influence on the prevailing views concerning the future life. It was followed some years later by *Beyond the Gates* and *The Gates Between.* Other writings are *Men, Women, and Ghosts, The Story of Avis, Hedged In,* and *Songs of the Silent World.* Mrs. Ward's style is original, vigorous, and usually impressive. She has something to say and says it well, although at times her writing is more intense and highly wrought than her subject seems to require.

Ward, Mary Augusta Arnold (1851-1920), an English novelist, the granddaughter of Thomas Arnold of Rugby. She was born at Hobart, Tasmania, her father holding an educational post at that place. The family returned to England in 1856. In 1872 Miss Arnold was married to Thomas Humphry Ward. She has used the name of Mrs. Humphry Ward as a pen name. Mrs. Ward's first literary work was a child's story. She translated *Amiel's Journal* and wrote *Miss Bretherton,* but her work attracted no special attention until the appearance of *Robert Elsmere* in 1888, which made its author famous at once. Other novels are *The History of David Grieve, Marcella, Eleanor, Lady Rose's Daughter, The Marriage of William Ashe,* and *Helbeck of Bannisdale.* Mrs. Ward's novels are conceived powerfully and are well executed, although they vary greatly in point of excellence.

Warner, Charles Dudley (1829-1900), an American editor and writer. He was a native of Plainfield, Massachusetts. He was graduated at Hamilton College in 1851 and by the law department of the University of Pennsylvania in 1856. He practiced law in Chicago for a few years. In 1860 he removed to Hartford, Connecticut, where he continued to reside for the rest of his life. Here he lived neighbor to Mark Twain and Mrs. Stowe. He held various editorial positions on the *Evening Press* and on the *Courant,* a morning paper in which he held an interest. Letters of travel, printed in the *Courant,* and a series of articles, afterward published under the title of *My Summer in a Garden,* brought him into prominence as a cheery, humorous writer. In 1884 he took charge of the *Editor's Drawer,* a department of *Harper's Magazine.* Warner's reputation as a man of letters rests on his success as an essayist. A list of his writings gives a score or two of titles. The most noted are perhaps *Back-Log Studies, My Summer in a Garden, My Winter on the Nile, The Golden House,* a novel, and *The Relation of Literature to Life.* He was editor-in-chief also of the *American Men of Letters Series,* and the *Library of the World's Best Literature.* The single essay by which he is best known to schoolboys is *A-Hunting of the Deer.*

Warp and Woof, the two sets of threads by the interlacing of which textile fabrics are made. The warp threads are those which run lengthwise of the web, and are put in place in the loom before the actual operation of weaving begins. The woof threads run across the web. The word woof is from the Anglo-Saxon and means literally the "on-web," that is, the part of the web thrown on or across the warp threads. The woof is called also the weft, that is, the thing woven, the weft threads being woven over and under the warp threads. "Filling" is still another name for the woof and an appropriate one since the warp threads are put in place, and then filled in with the woof threads.

Warrant, the legal name for a writ issued by a judicial officer directing an executive officer to apprehend and bring into court the person or persons named in the writ, the guilt or supposed guilt of such persons having first been sworn to by a complainant. Warrants were issued in Eng-

land centuries ago; at times they were issued in blank form. This practice was not adopted in the United States, however, and only the person or persons named in the warrant may be arrested under it.

In the United States the rules governing the issuance of warrants vary slightly from state to state; in some states the person or persons named in the warrant are within their rights in resisting arrest until a warrant is shown. A warrant is not necessary if a peace officer sees an offence committed.

Warren, John Collins (1778-1856), an American surgeon, was born in Boston. He was a graduate of Harvard, later studying medicine at London and Paris. He succeeded his father, John Warren, as professor of surgery at Harvard. He was one of the founders of the *Boston Surgical and Medical Journal,* and for a long period was its editor. He was also one of the founders of the McLean Hospital for the Insane, and of the Massachusetts General Hospital. He was a pioneer in the excision of bones and joints, and introduced an operation for fissure of the soft palate. Warren gathered together a collection of specimens in anatomy, osteology and paleontology, now known as the Warren Museum. In 1849 he was president of the American Medical Association. Among his works are: *Diseases of the Heart, Comparative View of the Sensorial System, Surgical Observations on Tumors* and *Etherization.*

Warren, Joseph (1741-1775), an American patriot, hero of the Revolutionary War, upon the place of whose death the Bunker Hill Monument now stands. He was born at Roxbury, Mass., and was educated at Harvard University. In 1764 he began the practice of medicine in Boston. When the struggle between England and the American Colonies became intense, Warren allied himself with a group of ardent Whigs, and gave all the power of his voice, his pen and his influence to the patriot cause. Upon the outbreak of hostilities, he became even more severe in his criticism of the mother country, and in 1775 was elected president of the provincial congress that met at Watertown, Mass. He took a leading part in the Battle of Lexington, and was commissioned a major general. Offered the chief command of the patriot forces engaged at Bunker Hill, Warren refused, going as a volunteer. He was killed on June 17, in the final charge of the Battle of Bunker Hill.

Warren, Ohio, the county seat of Trumbull County, is on the Mahoning River and on the Erie, Baltimore & Ohio and Pennsylvania railroads, 52 miles southeast of Cleveland. The manufacturing industry is the mainstay of the city. A partial list of products includes shovels, boilers, electrical appliances, electric lamps, fire extinguishers, storage tanks, steel ranges, furniture, iron and steel.

Warren has good public schools, a public library, a Federal building, two parks and attractive municipal and county buildings. By the fourteenth census the population was 27,050.

Warren, Pa., an industrial borough and the county seat of Warren County, is situated at the junction of Conewango Creek with the Allegheny River, 66 miles east-southeast of Erie. It is served by the New York Central and Pennsylvania railroads. The city is in a rich natural gas and petroleum field, and petroleum refining is one of the principal industries. There are also manufactories of boilers, chemicals, furniture, iron and steel, gas engines and other commodities.

Warren is the seat of the State Hospital for the Insane. The schools are good and are supplemented by two libraries. Population in 1920, 14,272.

Wars of the Roses, The, a prolonged struggle between the houses of Lancaster and York, rival claimants for the crown of England. Before actual hostilities broke out the adherents of the Lancastrian faction wore the red rose as a symbol; the partisans of York, the white rose. In Act II, Scene IV, of *King Henry VI,* Part I, Shakespeare made much of the choice of colors. The period of these wars is given usually as 1447-1485, or between the narrower limits of military activity, 1455-1471.

Both houses were descended from Edward III who left four sons. The line of the elder ran out. The dukes of Lancaster were descendants of John of Gaunt, the third son; the dukes of York, descendants

of Edmund, the fourth son. Moreover Richard, Earl of Cambridge, second in the Yorkist line of descendants, had married Anne Mortimer, the last surviving descendant of the second son of Edward III, and thus the Yorkists were able to claim the throne on the ground of heredity, while the Lancastrians, already in possession of the throne, upheld the principle of election by parliament. From 1455 to 1471 England was distracted by the wars in which a comparatively small proportion of the people had any personal interest. In general, we may say that the north and west of England sided with the Yorkists; the south and east with the Lancastrians, who favored the commercial interests. Finally, Henry, Earl of Richmond, one of the younger Lancastrian line, won the decisive battle of Bosworth Field in 1485. No Yorkist of the male line remained to continue the struggle, and the wars came to an end. Well they might cease. Nearly all the male descendants of Edward III had been murdered or slain on the field of battle—the rival houses had all but exterminated each other. The reader need not grieve perhaps for selfish nobles who put their lives in play and lost, but what of 33,000 Englishmen who lay stricken in the snow of Towton field? The rank and file were not volunteers or adventurers. The customs of feudalism required the holders of land, willing or unwilling, to follow their lords to battle or lose their homes. The wars were carried on without an appeal to a vital principle. The American Civil War settled certain important issues which had to be settled and which we were not frank enough, and fearless enough, and fair enough, to settle in any other way. Few Englishmen regret the work done by Oliver Cromwell and his Ironsides, but the Wars of the Roses settled no great issue—no vital principle was involved. Nevertheless they performed a real service in the development of England. Serfdom had practically disappeared, but feudalism still existed, retaining all the ideas of privilege of earlier times. The Wars of the Roses effectually destroyed feudalism by destroying those who represented the institution of feudalism. As long as the old feudal ideas were kept alive by an hereditary nobility, no centralization of power in the hands of the king, nor rise of the power of the common people was possible. The Wars of the Roses swept away the old nobility and gave rise to a new, created by and dependent upon the king. They gave an opportunity for centralizing and unifying of the administrative and judicial departments, which without them would have been impossible.

Warsaw, the capital of Poland. In population and commercial importance it is the chief city of the Polish Republic. In 1920 there were 931,176 inhabitants. The city is situated on the left bank of the Vistula River. It is connected with a suburb on the right bank by a noteworthy iron bridge 1,660 feet in length. Warsaw became the capital of the kingdom of Poland about the middle of the sixteenth century. It has been devastated by fire a number of times. The older parts of the city have a mean appearance. The streets are narrow and crooked. The houses are huddled together without regularity of arrangement, looking not unlike the communities of squatters to be found on river flats and other unoccupied lands near some of our large cities. The commercial and newer parts are well built and present an imposing appearance. The most interesting edifice historically is the ancient castle of the Polish kings. It stands on a natural crag overlooking the river. The University of Warsaw was founded in 1816. Its grounds are adorned by a statue of Copernicus, the founder of modern astronomy. There are several cathedrals, a town hall, arsenal, mint, custom house, and military barracks. The Bazaar, a large square surrounded by arcades, has attractions for the tourist. There are important manufactures of metals, beer, tobacco, cloth, chemicals, furniture, and musical instruments. An extensive trade is carried on by railway, canal, and river with the adjacent country. The city is surrounded by a wall and ditch, and is commanded by a huge citadel erected by the Russians. The immediate vicinity of the city has been the scene of numerous engagements. One of the most memorable took place in the autumn of 1794, when the Poles made a valiant stand against the Russians. The latter carried the chief defense of the city by general assault. Fifteen

thousand Polish soldiers were driven into the Vistula and drowned. In 1915 Warsaw and its protecting forts were taken by the Germans. In 1920 the city was surrounded by a large Russian army, over which the Poles gained a signal victory. See POLAND.

Warship. See BATTLESHIP.

Wart, a button-like projection of the skin consisting largely of a bunch of projecting papillae. Common warts come and go, especially on one's hands, in a capricious way that surgeons have been unable to explain. Warts are not confined to people. The homely wart-hog of Africa has repulsive warts on its face. "Warty as a toad" is an everyday expression. Boys frequently have an ill-founded notion that warts are likely to come from handling a toad. Other odd notions are connected with warts, one, that the juice of milkweeds cures warts, and another that it causes them. If a wart is of suitable shape, it may be removed by tying a succession of small, hard strings around it tightly at intervals of a day or two, each string being tied tighter than the last, until the wart is starved out by choking, and dries up and falls off. A short rubber band wound around a wart several times will have the same result. A salve of acetic acid, which is much the same as highly concentrated vinegar, applied with a camel's hair brush to the tip of the wart a few times, will kill it off. Other remedies are nitrate of silver and tincture of iron. A malignant wart should be let alone until a surgeon's advice may be had.

Wartburg, The, a castle of Thuringia, Germany. It is situated on the summit of a huge rock, half an hour's climb, near the town of Eisenach. It is the ancient seat of the dukes of Saxe-Weimar. It was built in the latter half of the eleventh century. The hall of the Wartburg was noted for the poetic contests of the Minnesingers. In 1206 a famous trial of poets, known as the War of the Minnesingers, was held here. A German poem of the name describes the events of the great contest. In 1521 Frederick the Wise of Saxony pretended to capture Martin Luther on his return from the Diet of Worms and sheltered him in the Wartburg for nearly a year. Luther's room, table, chair, and footstool are still shown the tourist. See SAXONY; LUTHER; MINNESINGERS.

Wart-Hog, an animal allied to the swine. There are several species. One is a native of northern Africa, another of southern Africa. The wart-hog is so named from the warts which cover the face. Ordinary swine expose two tusks, but the canine teeth of the wart-hog project from both jaws. The wart-hog attains a length of four feet. The body is covered with scanty, reddish gray hair, with a black mane and a black stripe running along the back. Like the wild boar, to which it is related, the wart-hog is fierce and courageous. Like its relative it fights desperately when brought to bay, but it is a much more clumsy and forbidding animal than the boar of the northern huntsman.

Warwick, wŏr′ĭk, **Richard Neville, Earl of** (1428-1471), an English soldier and statesman. He was one of the most powerful noblemen in England. He had vast estates scattered all over the length and breadth of the land. He kept 500 mounted retainers. Six oxen were required daily to furnish his table. He was a frank, cordial man, idolized by the people, who believed that in the crowd of baser nobles he alone had the interests of England at heart. He is known in history as "The Kingmaker." He was one of the most prominent figures in the Wars of the Roses. He was related to both the Yorkists and the Lancastrians. At the opening of the war he took the side of York, but, having quarreled with that party, he marched on to London and placed the Lancastrian, Henry VI, on the throne. His biography is a series of military exploits. Sometimes victorious, sometimes defeated, he fought first on one side, then on the other, making and unmaking kings. He was defeated by Margaret of Anjou at St. Albans. He was slain finally at the battle of Barnet, April 14, 1471. Bulwer-Lytton's *The Last of the Barons* is a powerful story founded on the fortunes of Warwick.

Warwick Castle, the home of the earls of Warwick. It is situated on a massive rock on the right bank of the Avon, in Warwickshire, ninety miles northwest of London. In its prime the castle was a fortification of enormous strength. The

main gateway was provided with overhead holes through which to pour molten lead on besiegers. Caesar's Tower, the oldest part of the structure, but of unknown date, is 147 feet high. Guy's Tower, erected in 1394, is 128 feet high. The court within inclosed two acres. The Warwick vase, a huge receptacle for ale, is still preserved. It measures five feet eight inches in diameter at the lip and holds 163 gallons. Warwick Castle was said by Walter Scott to be "the fairest monument of ancient and chivalrous splendor which yet remains uninjured by time." Though injured by fire it is still considered the most sightly and magnificent edifice of the sort in England. The battlemented, ivy-covered walls, lofty towers, heavy portals, and deep windows combine with the surrounding park and the placid Avon water to form a beautiful picture. An impressive view may be had from the village bridge which crosses the Avon near by. Warwick Castle is thought to be the theme of Shakespeare's lines in *Macbeth* beginning:

> This castle has a pleasant seat; the air
> Nimbly and sweetly recommends itself
> Unto our gentle senses.

Warwick, R. I., a city that, with West Warwick, forms a manufacturing center and a residential suburb of Providence, five miles to the north. Warwick is on Narragansett Bay at the confluence of the Providence and Pawtuxet rivers, and is served by the New York, New Haven & Hartford Railroad. Though essentially a residential suburb, Warwick has manufactories of thread, cotton cloth and foundry and machine shop products. At West Warwick there are large manufactories of cotton goods and other articles.

Warwick was founded in 1642 by a small company, at the head of which was Samuel Gorton, and bore the name of Shawomet until 1648, when the name it now has was adopted in honor of the Earl of Warwick. At first Massachusetts claimed jurisdiction over it and in 1643 the little settlement was almost destroyed by that state. It has good schools, a library and some fine parks. It was the birthplace and early home of General Nathanael Greene. Population, Warwick, 13,481; West Warwick, 15,641. Its growth has been rapid.

Washburn, Cadwallader Golden (1818-82), an American soldier and political leader, was born at Livermore, Me. In 1839 he removed to Iowa and later to Illinois, where he studied law; he began practice at Mineral Point, Wis. In 1854 he was elected to Congress, and was twice reelected, serving until 1861. After the outbreak of the Civil War he raised the Second Regiment of Wisconsin Cavalry and was mustered into Federal service in February, 1862. In the same year he was made a brigadier-general of volunteers and later was promoted to major-general, after which he was given a division in the Army of the Tennessee. In 1864 he was placed in charge of the District of West Tennessee, which position, with the exception of the period in which he was in command of the District of Vicksburg, he held until his resignation from the service in 1865. He was again a member of Congress from 1867 to 1871, and from 1872 to 1874 was governor of Wisconsin. Governor Washburn made generous contributions towards educational purposes, built an observatory at the University of Wisconsin, and founded an orphan asylum at Minneapolis He was a brother of Elihu B. Washburn.

Washburn, Elihu Benjamin (1816-1887), an American political leader and diplomat who, through his insistence on economy in the national service, won the sobriquet of the "Watch Dog of the Treasury." He was born at Livermore, Maine, and was educated at Harvard College. In 1840 he was admitted to the bar, beginning practice in Illinois. Elected to Congress in 1855, Mr. Washburn served continuously until 1869. For ten years, he was chairman of the Committee on Finance. Among the many bills he introduced was one for the establishment of national cemeteries. He was chosen Secretary of State in President Grant's cabinet, but soon resigned this position to become minister to France. Mr. Washburn represented the German interests during the Franco-Prussian War, and during the chaotic days of the Paris Commune, 1871, was the only foreign representative to remain at his post. He returned to the United States in 1877, resigned his ministry, and setttled in Chicago.

Washburn, Emory (1800-77), an American lawyer, was born in Leicester, Mass., and studied at Dartmouth and Williams colleges. He served in both branches of the state legislature and also was a justice of the common pleas court. From 1854 to 1855 he was governor of Massachusetts. From 1856 to 1876 he was professor of law at Harvard. He wrote several books on legal subjects, among which are: *American Law of Real Property,* and *American Law of Easements and Servitudes.* He also wrote a number of pamphlets dealing with the law, and lectured on the same subject.

Washburn, Margaret Floy (1871-), an American educator and psychologist, was born in New York City and educated at Vassar and Cornell. Miss Washburn was professor of ethics and psychology at Wells College from 1894 to 1900, lecturer in psychology at Cornell from 1900 to 1902, and assistant professor of psychology at the University of Cincinnati from 1902 to 1903. From 1908 she was professor of psychology at Vassar.

She has made to leading journals many contributions dealing with questions of perception, and is the author of *Animal Mind* and *Textbook of Psychology.*

Washington, Booker Taliaferro, an American educator. His mother was a negro slave. As nearly as may be known, he was born in 1858 near Hale Ford, Virginia. When a small lad his mother moved to Malden, West Virginia, where he found work in a salt furnace and in a coal mine. He attended a night school. Having heard of the school at Hampton for negroes he made his way thither in 1872, living on charity and sleeping under sidewalks as he went. The instructors of that institution soon recognized in him a lad of unusual promise and ability. When he reached Hampton the authorities had no room for him, yet hadn't the heart to turn the honest, pleading chap away. He had no means of support. They had practically no money. However they managed to crowd him in in some way. He was given a schoolroom to clean. He swept and dusted so thoroughly that his teacher saw at once that there was something unusual in the fellow. After remaining at Hampton two or three years, earning his way by working in the fields and otherwise, he returned to Malden to his mother's family and opened a school for colored children. In 1879 he was recalled to the institute at Hampton as an instructor.

In 1881, on the receipt of an application for a school from the colored citizens of Tuskegee, Alabama, Washington was sent to do what he could. The state had made a grant of $2,000 a year. A grant of wild land was the only visible sign of an institution. Washington fell to work with energy, rallied students around him, cut down timber, built cabins, opened up fields, and, by virtue of his own industry and genius, practically created a colored college in the midst of pine woods. When it is considered that not an ancestor of the students who came to his school had ever learned to read or write, and that he had practically no models on which to work, the Tuskegee School may be considered one of the most remarkable educational achievements on record. It is pleasant to add that of late sufficient funds have been provided to carry out the founder's ideas. His ideas are widely adopted in negro education.

Mr. Washington himself proved to possess unusual power as an orator. He traveled in many parts of the United States and in Europe lecturing on negro education and on educational problems in general. He was received with respect and listened to with delight. He wrote several books. The most noted is *Up From Slavery,* an autobiographical volume published in 1901.

Booker T. Washington was thoroughly American in all his ideas and ambitions. He believed in giving the negro an industrial as well as an academic education. It is not unjust to say that Booker T. Washington was the most eminent negro in the world. He died in 1915.

See TUSKEGEE; NEGRO.

Washington, George (1732-1799), the first president of the United States. He was born on the banks of the Potomac in Westmoreland County, Virginia, February 22, 1732. He died at Mount Vernon, December 14, 1799. In the time of Cromwell the Washingtons were English Royalists, and two of that name, Lawrence and John, emigrated to America after the failure of

the king's cause at home. John Washington was the great-grandfather of George. He built the old plantation house in which our hero was born. The house was burned down soon after George's birth. The place of Washington's birth is marked by a slab. George's father, Augustine Washington, removed to a new home on the Rappahannock, opposite Fredericksburg. The Rappahannock home has been destroyed also, but pictures remain to show that it was a large, old-fashioned Virginia farm house, divided by a hall. The house had two large outside chimneys, one at each end.

George Washington's father died when he was about twelve years old. Mary Ball Washington, George's mother, was a second wife. There were two sons, Lawrence and Augustine, by a former marriage. Mary had six children. There were three brothers and two sisters younger than George. Lawrence and Augustine were educated in England, but the widow's means did not permit her to send George abroad. She appears to have been a woman of no little ability and character. She managed her own plantation and brought up her children well, giving them such education as lay within reach. She died in the first year of Washington's administration as president.

The labor on the plantation was done by slaves. George grew up a planter's son, that is to say, a gentleman. When not in school he was at liberty to ride, play, hunt, or amuse himself as he pleased. To work or even to run errands would have been considered beneath his station in life. The plantation was an old-fashioned place. The house had broad verandas and stood among beautiful trees in the midst of well tended gardens. There were cabins for the negroes and great tobacco sheds in which the tobacco was hung up on poles to dry. There were barns, granaries, and storehouses, a tailor shop in which clothes were made up for the slaves, and an outside kitchen where the cooking was done for the family. Bacon was made in the smokehouse. Milk, butter, and eggs were kept in a spring house built over a running brook. Orchards, pastures, and tobacco fields lay on every side. A sort of pastoral simplicity prevailed. The slaves were well treated and were happy and contented. The surrounding forests and streams abounded in game and fish. George learned to hunt deer, bears, wild turkeys, and canvas-back ducks, and to catch fish. The colored boys brought home fresh oysters from the Chesapeake. Wagon roads were few, but the stable was full of riding horses, and the family coach was gotten out on occasion and was drawn by four horses.

George lived an ideal boy's life. He grew up tall, straight, and athletic. He could outrun and outjump every boy in the neighborhood. He had strength of arm. He could fling a pebble across the Rappahannock. He was fond of riding and was never without a good horse. Although unable to send him to England to attend college Mary Washington appears to have taken great pains with her son's training, and to have been proud of his courage, truthfulness, and honesty. In school he studied reading, arithmetic, and writing. He was taught to keep accounts and to draw such legal papers as deeds and leases, a sort of knowledge expected of every gentleman. His exercise books have been preserved. They are models of accuracy and neatness. While still a mere lad he filled one of his blank books with 110 "Rules of Civility and Decent Behaviour in Company and Conversation," showing that the question of personal conduct had been impressed on his mind at an early date.

When Augustine Washington died he left the older children plantations. Lawrence Washington received Hunting Creek, afterward renamed Mount Vernon; Augustine received an estate some miles up the Potomac called Bridge's Creek, the old home where George was born. George spent a considerable part of his time with the last brother at Bridge's Creek in order to attend a good school in the vicinity. The older half-brother, Lawrence, married Annie Fairfax, the daughter of William Fairfax, whose estate lay also on the Potomac, midway between the homes of George's two half-brothers. In going back and forth from one plantation to the other George made frequent visits at the Fairfax mansion. In this way he became acquainted with a bachelor cousin, Lord Fairfax, a wealthy English gentleman who owned, it was said,

well nigh a fifth of Virginia. The old gentleman and George became fast friends. They made long hunting trips together and camped in the mountains for a week at a time.

As there was no plantation for George, he saw the necessity of doing something for himself. Under the advice of Lord Fairfax he studied geometry and trigonometry and prepared himself for surveying. Lord Fairfax owned large tracts of land over the Blue Ridge Mountains in what is now West Virginia. In 1748 he made George one of a surveying party sent out to make a report on these lands. They cut their own roads, hunted their own food, and camped by wood fires at night. They ate with their hunting knives and used chips for plates. There were flooded streams to cross and many a hardship to endure, but George acquitted himself so well that the old gentleman was delighted and secured George a commission, making him what we should call a county surveyor.

Through this friend's influence he was employed by the planters far and near to run their lines and locate their boundaries. The surveying of that day was slovenly and untrustworthy. George soon won a reputation for good work. It is said that his surveys, still on record, are models of neatness and accuracy. Even though he had never entered public life he would have been a man of local importance. An eminent lawyer, who later had many titles to look up, said that about the only surveys he could depend upon were those made by the young Virginian, George Washington. George spent three years at this kind of work, much of the time in West Virginia. He was tall and straight and had wonderful endurance. He wore a number eleven shoe. He dressed in buckskin like an Indian. He talked little.

About this time, wealthy Virginians began to look toward the Ohio Valley as a place of investment. In 1749 the Ohio Company was founded for the purpose of acquiring land and trading with the Indians. It was composed of London merchants and Virginia land speculators. George II made the company a grant of 600,000 acres on the southeastern bank of the Ohio. Hostilities soon arose between French traders, English traders, and Indians. With the first rumors of hostility Washington was made an adjutant-general of the district in which he lived. He began to study military tactics. He raised companies of militia and drilled them in the manual of arms. This work came all the more easy to him because when a boy he was very fond of leading his companions in mock battles, so much so that his playmates called him sometimes Captain George.

In 1751 Lawrence, the half-brother who lived at Mount Vernon, was taken ill. George went with him to the West Indies in hopes that the climate might prove of benefit. This was the only foreign voyage that George ever took. He formed a very poor opinion of the people of the West Indies, saying that they were shiftless and extravagant, that they would not work, and that they never would be out of debt. While absent he contracted the smallpox. He bore pock marks to the time of his death. Lawrence's health did not improve. He returned to Mount Vernon and died leaving his wife and daughter in George's care. George was made heir to the estate in case the daughter should die before she came of age. In this way he became the owner of Mount Vernon, the place he called home for the rest of his life.

In the fall of 1752, Dinwiddy, governor of Virginia, gave Washington a major's commission. In the fall of 1753 he was sent with a message to the French commander on Lake Erie. In reality he was sent to learn the intentions of the French, and to warn them not to intrude further on soil considered British. The Frenchman was polite but returned an evasive answer. Washington came back convinced that the French intended to have and to hold the Ohio Valley. He was absent eleven weeks. The trip was hard and dangerous. He narrowly escaped drowning. A treacherous Indian guide very nearly took his life.

In the spring of 1754 Colonel Frye was sent with a force of 400 men to dispossess the French who had begun to build a fort on the site of what is now the city of Pittsburg. This they called Fort Duquesne. Colonel Frye died. The charge of the expedition fell on Washington who was sec-

ond in command. He advanced within a few miles of Fort Duquesne, and, hearing that it had been fortified too strongly for him to expect to take it, he threw up earthworks at a place called Great Meadows. This he called Fort Necessity, but hearing that a party of Frenchmen had set out to attack him, he took the French party by surprise, killed their captain and nine men, and took a number of prisoners. Out of fifty in the French party, but eleven escaped. Washington was now besieged by an overwhelming French force and, thinking discretion the better part of valor, surrendered on condition that he be permitted to march back to Virginia unmolested. The next year Washington accompanied Braddock on his fatal expedition. He did all he could to save Braddock from defeat and to protect the retreat. On his return to Virginia Washington was employed in organizing troops for the defense of the frontier against the French and Indians.

In the meantime Washington had made the acquaintance of a beautiful widow, Martha Custis. He himself was now a wealthy man, the owner of Mount Vernon with all its buildings and slaves. Mrs. Custis was a wealthy widow. She also had estates and slaves to work them. January 6, 1759, they were married and took up their home at Mount Vernon. They had no children, but Mrs. Custis had a son and a daughter, Nellie, by her former marriage. The son grew up and married, but he and his wife died young. Washington brought their children home to Mount Vernon and adopted them as his own. A number of nephews and nieces were also members of his family, so that, although Washington had no children of his own, Mount Vernon never lacked for little folks. Mrs. Custis, now Mrs. Washington, is the Martha Washington of the White House, the Martha Washington for whom the Martha Washington geranium and rose have been named.

Washington and his wife were much attached to each other. They lived an ideal life for sixteen years. During the forenoon Mrs. Washington superintended her house, seeing that the Aunt Chloes and Dinahs did their work properly and that food and clothing were provided for the army of slaves. Washington rose at four o'clock and spent the forenoon in the saddle. He superintended the building of fences, the digging of ditches, the ploughing of fields, the planting of trees, the building of cabins and other improvements throughout his own and his wife's extensive estates. In the afternoon he wrote letters and posted his books. He was a careful bookkeeper. He kept a separate account for his horses, cattle, tobacco, slaves, and other important items. He was so strict in small money matters that he had the reputation of being mean, even parsimonious. Twice a year he sent his London agent an order for ploughs, hoes, spades, books, furniture, spices, wines, medicines, and clothing, not forgetting to order toys for the Custis children, including a "fashionably dressed doll-baby" for Miss Custis, then four years old.

The mansion at Mount Vernon was the scene of frequent social gatherings. Suppers, music, and dancing were prominent features. Major Washington and his beautiful wife were welcome visitors in the best homes of Virginia and Maryland. In season, fox hunting, fishing, and duck hunting were the chief outdoor sports. The slaves of the Custis and Washington plantations married back and forth. This is a fitting place to state that, in his will, Washington left directions that upon the death of himself and wife all his slaves were to be set free.

This happy life, however, came to an end. The Stamp Act, the Boston Tea Party, Concord, and Lexington stirred Virginia to the very center. June 15, 1775, the Continental Congress elected George Washington commander-in-chief of the army. Without even returning to his home, he sent "Dear Patsy," that is to say, "Wife Martha," a letter bidding her goodbye. July 2 he rode to Cambridge and under a famous tree, since known as the Washington elm, took command of the patriot army. The evacuation of Boston, the disasters of Long Island, the capture of the Hessians at Trenton, the dark winter at Valley Forge, the friendship of Lafayette, the jealousy of Charles Lee, the battle of Monmouth, and the surrender of Yorktown belong to the history of the American Revolution.

Washington is the central figure. Others were faint-hearted, but Washington never

despaired. Others were ready to quit, but he never gave up. His military tactics have won for him the name of "The American Fabius." When he could not fight he ran away. When the enemy stopped pursuing he came back again. When the British commanders thought they had him trapped he always had some surprise in store for them. When they felt secure he swept down upon them, as at Trenton. The German Von Moltke called Gen. Washington one of the world's great strategists. Few military commanders have contended against greater odds, or, even making allowance for American patriotism, with more difficult material.

After the surrender at Yorktown Washington took up his headquarters at Newburg on the Hudson River. When the British had actually sailed from New York he called his officers before him, embraced them, and bade them farewell. He then presented himself before the Congress at Annapolis. He submitted an account of the moneys that had passed through his hands, with a statement of expenses incurred in the maintenance of his official family, in all over $74,000, detailed to the last penny. He refused all compensation for his own services, resigned his commission, and retired to Mount Vernon.

It would be difficult to find a parallel instance. It is not often that a great military leader lays down the command of an army without reserving to himself a dollar or a shred of authority. This was not a difficult thing for Washington to do. He had not fought for money, or even for glory, but for the independence of his native country. All through the war his own wishes were to be at home with his family, where he had comfort and abundance. For a man of his character and domestic tastes to return to Mount Vernon was the most natural thing for Washington to do, but none the less, it is the act that in the eyes of the world made him great.

Washington was not allowed to remain long at home, however. He was soon called upon to serve in the great convention that framed the Constitution of the United States. He did very little talking in the convention, but his opinion of what was just and fair to the various colonies had weight. In the question of the adoption of the Constitution it is probable that Washington's reputation for unselfishness, and the simple fact that he approved it, had more influence with the colonists to induce them to accept it than all the arguments of the newspapers and public speakers of the day.

When the Constitution went into effect, Washington was the unanimous choice of the electoral college for the presidency. On his way to New York where the Congress was in session he was the recipient of much attention. At Trenton an arch was thrown over a bridge over which he must pass. It was adorned with laurel leaves and flowers from the conservatories. An inscription of leaves and flowers formed these words: "The defender of the mothers will be the protector of the daughters." A group of little girls carrying baskets of flowers strewed the way in front of him, singing an ode composed for the occasion. On the 23d of April, 1789, he appeared on the street gallery of the old city hall of New York, then occupying the site of the present federal custom house. He took the oath of office in the presence of an immense concourse of people and delivered an impressive address to the members of the two houses.

During Washington's eight years of office, many important questions came up for settlement. He formed a cabinet of able men, making Alexander Hamilton secretary of the treasury, Henry Knox secretary of war, Thomas Jefferson secretary of state, and Edmund Randolph attorney-general. At the close of his second term of service, he refused to accept the office for a third term. His example, through its repetition by Jefferson, has become an unwritten law.

It would be pleasant to say that Washington was treated with respect by all during the presidential administration. As a matter of fact, however, there were two political parties bitterly opposed to each other. Washington was the object of many a venomous attack. He was accused of being monarchical in his tendencies. The fact that he was aristocratic in his notions and thought it well to ride in a carriage drawn by six horses and to preserve many

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THE NATIONAL CAPITOL, WASHINGTON, D. C.

of the forms with which English monarchs surround themselves made a very unfavorable impression on the yeoman element. In their ignorance or ill-will demagogues even ventured to assail his honesty of administration. Washington was glad to retire again to Mount Vernon, where with his wife he resumed, so far as possible, his old life.

Washington was a member of the commission that located the proposed national capital. He chose a site that might be seen from Mount Vernon. The city was named for him. He admitted to Martha Washington that the honor gave him pleasure. December 12, 1799, he caught cold from riding in a storm of sleet and rain. Two days later he passed away. Martha Washington survived him two years. Their stone coffins rest side by side in the same vault at Mount Vernon. To this day boats plying up and down the beautiful Potomac toll their bells softly when they pass the tomb of Washington.

See MOUNT VERNON; LAFAYETTE; BRADDOCK; TRENTON; VALLEY FORGE.

Washington, one of the Pacific states, commonly known as "The Evergreen State," is in the northwestern corner of the United States. British Columbia bounds it on the north; Idaho on the east; Oregon on the south; and the Pacific Ocean on the west. About 300 miles of the southern boundary are formed by the Columbia River; and the Strait of Juan de Fuca forms the extreme northwestern boundary.

THE PEOPLE. The fourteenth United States census gives the population of Washington as 1,356,621, placing the state twentieth. Of the total inhabitants only 250,500 were foreign born. The people were distributed in the proportion of 20.3 to a square mile, and were 55.2 per cent urban. The largest city, Seattle, had a population of 315,312 in 1920, and a population of the next city, Spokane, was 104,437. Six other cities had more than 15,000 inhabitants, and two others more than 10,000. The capital, Olympia, has 7,795 inhabitants.

SURFACE AND DRAINAGE. Washington is divided into two unequal sections by the Cascade Mountains; the eastern section is the largest. The Cascade range is about 100 miles wide at the Canadian border and about 50 miles wide at the southern state line; the average elevation of the crest of the main range is 5,000 feet, but in the range are five peaks that exceed 10,000 feet. These are St. Helens Peak, 10,050 feet; Glacier Peak, 10,436 feet; Baker Peak, 10,837 feet; Adams Peak, 12,307 feet; and Mount Rainier, 14,408 feet. East of the Cascades, and well north, is another irregular mountain chain, forming a link with the Rockies.

West of Puget Sound is the Coast Range. This range is neither as high nor as rugged as the Cascades, becoming broad and rounded in the southern part of the state, and having a mean elevation of 3,000 feet. Near the northern border, however, is the sharply defined part of the range known as the Olympic Mountains. In this group the highest peak is Mount Olympus, 8,150 feet.

Cutting down through western Washington between the Cascade and Coast Ranges is Puget Sound, the indentations of which form one of the finest harbor systems in the world. The Sound extends southward more than half the length of the state, and from its lower end a broad depression, averaging 500 feet above sea level, continues southward into Oregon, where it is known as the Willamette Valley. This depression is the most fertile part of the state, and is also the most densely populated region. Bellingham, Everett, Seattle, Tacoma, Olympia and Port Townsend are all on Puget Sound.

The northeastern corner of the state is drained by the Clark River, which enters from Idaho, swings northward into Canada, and comes back into Washington as the Columbia. The latter is the great river of the state. From the international boundary it flows southward more than one-third the length of the state and then turns sharply westward, traversing three-fourths of the distance between the Idaho state line and the Cascades. A few miles from the Okanogan-Columbia junction (the Okanogan also enters from Canada) the Columbia flows southward again—swinging to the east near the Oregon line but turning west-

ward on the line—and takes a generally southwestward course to Vancouver, whence it flows northwestward until met by the Cowlitz River. From this junction it flows almost due west to the Pacific. Its largest tributary, the Snake, drains the southeast corner, joining the greater stream near the Oregon line; in the same part of the state the Yakima River enters the Columbia from the west. The western section is drained by numerous small streams that empty into Puget Sound, and by the Chehalis River, which bisects the Coast Range and enters the Pacific through Gray's Harbor. There are many small mountain lakes in the state. The coast line is regular, having few harbors; the most important being Gray's Harbor.

Climate. Western Washington has a mild, equable climate; flowers bloom throughout the year; but the rainfall is unusually heavy, often exceeding 125 inches a year. The eastern section is in part semi-arid, all but the mountain slopes and the southeastern corner requiring irrigation. Here too the greatest extremes of heat and cold are felt. But the air is clear and invigorating, and the climate is on the whole very healthful.

Minerals. Washington is the only Pacific state that has coal in workable quantities, the output averaging 3,000,000 tons annually. The principal coal measures are west of the Cascades and east and south of Puget Sound. Gold, silver and copper are mined north of the center line and east of Puget Sound. Iron, granite, marble, asbestos, talc, cement rock, limestone and sandstone are present in small quantities.

Agriculture is the principal industry. In the fertile, warm and well-watered western section the crops native to the temperate zone are easy to raise. The great crop is wheat; this is followed by oats, potatoes, corn, barley, hops, hay and fruit. Washington leads the Union in the production of hops, apples and loganberries. Plums, pears, peaches and cherries are also grown in large quantities. More than 500,000 acres of the state are under irrigation (1923) and the projects that have been planned will reclaim other thousands of acres. The largest cereal crops are grown on the great plains of the eastern section. Stock raising is yearly increasing in importance.

Forests and Fisheries. Washington has 17,550,000 acres of forests. West of the Cascade Range are great forests of Douglas fir, white and yellow pine, spruce and cedar, while east of the range the principal stands of timber consist of yellow pine, tamarack and red fir. The state's lumber products were valued at $220,512,000 in 1920.

The fishing industry is of the first importance; the largest catch is salmon, which is taken in Puget Sound, Gray's Harbor, Willapa Bay and the Columbia River. In the production of salmon Washington leads the United States. Halibut, cod, mackerel, herring, clams, oysters, shrimp and crabs are also taken in valuable quantities.

Manufacture. By the last industrial census Washington had 4,918 manufactories; by far the greater part of these were in one or another way connected with the lumbering industry. Shingles, doors, sash and furniture, besides finished lumber for building, are the chief lumber products. Seattle and Tacoma build wooden ships, and Seattle is an important center of the steel ship industry. Flour and grist milling, cement making, fish canning, the making of clay products and dairy products, and printing and publishing, are the other important industries.

Transportation. Washington had 7,412 miles of railroads in 1921. The state is crossed by three transcontinental lines; the Columbia River is navigable on the southern border; and above its junction with the Columbia the Snake River is navigable for 200 miles. The principal railroads are the Great Northern, Northern Pacific, Chicago, Milwaukee & St. Paul, Oregon & Washington and Spokane, Portland & Seattle. Tacoma, Seattle and Gray's Harbor are the chief ports.

Institutions. The charitable and correctional institutions are supervised by a Director of Business Control. The state institutions are the prison, reformatories at Olympia, Monroe, Tacomo, Everett and Seattle, State Training School, Washington Veterans' Home, State Home for the Fee-

ble-Minded, three hospitals for the insane and schools for the deaf and the blind. The state has twelve Indian reservations.

EDUCATION. Education is free and compulsory for all children between the ages of eight and sixteen. In 1922 there were 2,265 public graded schools with an enrollment of 246,212 and 389 public high schools, with an enrollment of 54,588, three state normal schools, a state college of agriculture, and the University of Washington.

Other higher institutions are Whitman College, Gonzaga University and the College of Puget Sound. At the last census the illiterates constituted only 1.7 per cent of the total population.

The state university, at Seattle, was founded in 1861 and the first class was graduated in 1876. The institution is organized into colleges of arts and sciences, law, engineering, pharmacy, mines and forestry and a graduate school. The faculty numbered 262 and the student body 6,631 in 1922.

GOVERNMENT. The constitution under which Washington is governed was adopted in 1889. This provides for a legislature divided into two houses. Members of the house of representatives may not number more than 99 nor less than 63, and the senate must have not more than one-half nor less than one-third the number of members of the house of representatives.

The executive body consists of the governor, lieutenant-governor, secretary of state, treasurer, attorney-general, auditor, superintendent of public instruction and commissioner of public lands. All executives are elected for four years.

The judiciary consists of a supreme court of one chief justice and eight associates, and a superior court for each county.

HISTORY. In 1792 Captain Gray, commanding the United States ship *Columbia,* explored the Columbia River, and on the basis of this exploration the United States claimed the territory drained by the stream. In 1805 Lewis and Clark descended the Snake River and entered the Columbia, following the latter to the Pacific Ocean. Until 1853 Washington and Oregon were united, but after separation in that year Washington was organized as a separate territory. Gold was discovered at about this time, and settlers entered the new territory in large numbers. The Indians rose against the whites in 1855, but were soon pacified.

Because of lack of railroads, the territory developed slowly. But after 1884, when the first railroad was built into this region, industrial development was exceedingly rapid; the forests and fisheries were exploited, coal was mined and the argicultural industry grew. After several requests for admission, the territory became the state of Washington in 1889. Development continued and the state becomes more important each year.

The following statistics are the latest to be had from trustworthy sources:

Land area, square miles	66,836
Water area, square miles	2,291
Forest area, acres	17,550,000
Irrigated area, acres	529,899
Population (1920)	1,356,621
White	1,319,777
Negro	6,883
Indian	9,061
Asiatic	20,900
Chief Cities:	
Seattle	315,312
Spokane	104,437
Tacoma	96,965
Everett	27,644
Bellingham	25,585
Yakima	18,539
Number of counties	39
Members of state senate	48
Members of house of representatives	99
Salary of governor	$6,000
Representatives in Congress	7
Assessed valuation of property	$1,111,890,242
Bonded indebtedness	None
Farm area, acres	13,244,720
Improved land, acres	7,129,247
Wheat, bushels	54,662,000
Oats, bushels	10,500,000
Potatoes, bushels	7,425,000
Barley, bushels	2,797,000
Corn, bushels	2,400,000
Hops, pounds	1,700,000
Hay, tons	2,666,000
Apples, bushels	29,062,000
Wool, pounds	5,490,000
Domestic Animals:	
Horses	284,000
Mules	20,000
Milk cows	216,000
Other cattle	290,000
Sheep	645,000
Swine	267,000
Manufacturing establishments	4,918
Capital invested	$574,235,183

Operatives	132,928
Raw material used	$443,177,531
Output of manufactures	$809,622,984
Flour, value	$81,141,000
Lumber products, value	$220,512,000
Coal, tons	3,348,214
Gold, value	$148,000
Silver, value	$195,226
Miles of railway	7,412
Teachers in public schools	8,905
Pupils enrolled	301,700

Washington, the capital city of the United States. It is situated on the east bank of the Potomac. The wharves of the city are washed by tide water and are about 100 miles from Chesapeake Bay. The city was named, of course, for George Washington. He spoke of it modestly as the "Federal City."

The plan of the city is peculiar. First of all, thoroughfares, known as streets, were laid out on north and south and east and west lines, dividing the city into blocks, checkerboard fashion. To render it easy to reach any part of the city, without the loss of time required to travel at right angles, twenty-three diagonal thoroughfares, known as avenues, were laid out. Their intersections form points from which streets and avenues radiate like the spokes of a wheel. Thus large focal squares, like those occupied by the Capitol and the White House, may be approached by a score of streets and avenues. Many blocks are parallelograms; others are split by diagonals into triangles; others have lost a corner, or have but a corner left. The streets running east and west are lettered; those running north and south are numbered. The avenues are named, usually, for the states. The narrowest street is sixty feet wide. Pennsylvania Avenue, leading from the Capitol to the White House, is 160 feet wide. It is one of the great streets of the world. In early days the Portuguese minister dubbed Washington "The City of Magnificent Distances."

The city is well paved, chiefly with noiseless asphalt, and is kept scrupulously clean. Innumerable little corners and parks are beautified by shrubbery and flowers and embellished by bronze statues of distinguished Americans. The grounds of the Soldiers' Home, the National Zoological Garden, the United States Naval Observatory, and especially the White House grounds and the Mall, the latter a tract half a mile wide and extending from the Capitol to the Potomac, are simply delightful in their effect. The roar of wholesale traffic is absent. Public buildings give an air of stateliness. The streets have a gay, holiday appearance. The atmosphere of the city is distinctly American, but the general impression is not unlike that produced by a European capital.

Next to the Capitol in interest is the White House, the residence of the President. The architect was an Irishman. It is understood that the building is modeled after the palace of the Duke of Leinster, near Dublin. It is a stone building 170 feet long and 86 feet deep. It is two stories high. The White House is painted white. It has an Ionic portico on the north front. The original building, begun in 1792 and occupied by John Adams in 1800, was burned by the British in 1814. Four years later the present building was erected. The lower floor is devoted largely to reception rooms. The Blue Room is used for the reception of diplomats; the East Room for the public; the Red Room, with hangings of Pompeian red, is used by the ladies of the family for the reception of callers and for social gatherings. The state dining room, with 1,500 pieces of exquisitely decorated china and table services of silver and cut glass, and the conservatory, are on this floor. The President and his family live upstairs. In 1903 a wing was built for office quarters in which the President and his secretaries do their work and may be seen like other business men. The reception rooms are adorned with portraits of the Presidents and members of their families. They are open usually to the public. Some Presidents used the name Executive Mansion, while others have preferred the old name of White House.

The Agricultural Department, a branch of the government service, has here a notable herbarium. The museums have an interesting display of agricultural products illustrating the growth and industrial use of silk, cotton, wool, flax, etc. Silk, for instance, may be seen in all stages of development from the worm to a piece of

silk dress goods. The experimental grounds contain many interesting plants. The Botanical Gardens contain rare plants from all parts of the world.

The Library of Congress, completed in 1897 at a cost of $6,000,000, is an imposing building with gorgeous inside finish. There are paintings and statuary of merit, and fifty miles of shelving with more than 3,400,000 volumes. The ultimate capacity is 4,500,000 volumes. Telephones and pneumatic tubes enable the attendant to call for a book in the remotest part of the building and have it on his desk in a few minutes. Books are returned to the stack rooms in the same way. An underground tunnel and an automatic tray carrier enable members of Congress to obtain books for use in the Capitol in a very short time. Books may be consulted freely by the public, but may not be borrowed.

The tour of the Treasury Building may be made on any business day. It is a stately pile of sandstone and granite just across the street from the White House. It ranks next to the Capitol in architectural importance. A lofty colonade of thirty-eight Ionic columns marks the front entrance. American and Italian marble have been used lavishly for interior finish. The cash room, or cashier's office, is the first department to attract attention. It resembles a large bank which, in fact, it is, the national banking room. A gallery enables visitors to look down on piles of gold, silver and currency which assistants are busily paying out on orders presented at the wickets. A visitor desiring the honor of doing business with the government may step up to the proper window, present a greenback or other government note for redemption, and receive the gold or silver it calls for. Currency, postage stamps, and revenue stamps are printed in a separate building. A million dollars' worth of new bills is brought to the treasury daily in a steel wagon attended by armed guards. The notes are counted by expert women and done up in packages for issuance. In a special department, known as the redemption division, old notes are received and exchanged for new. A force of experts is engaged in piecing together bills nibbled by mice, worn and torn currency, bills damaged by fires, chewed by insects, and the like. Old currency is destroyed in a huge steel receptacle called a macerater. It contains water and closely set knives that grind the contents into a fine pulp. Each day at one o'clock four officials, each one with a key, all four keys being required to open the macerater, throw in, it may be and usually is, a million dollars of old paper money, relock and start the mill. It can hold a ton of pulp. June 27, 1894, 151,000,000 dollars worth of old currency and bonds was destroyed. The exhibit of old coins and of counterfeit notes is interesting. Visitors are shown the entrances to the vaults where 100,000,000 silver dollars and as much gold are guarded night and day. In fact, $800,000,000 is not an unusual sum to have on hand. There are sixty-eight regular watchmen. Arms are at hand to equip 1,000 men. The police department and the army are in close communication. An electric alarm would bring a relief force in a few minutes.

The State, War and Navy Department is a four-storied granite building, possibly the largest office building in the world. There are two miles of marble hallways. The stairways are of granite and bronze, calculated to render the building fireproof. The loss of the records and archives deposited here would be a calamity to civilization. There are priceless historical relics. The original laws of the United States, the crabtree staff of Franklin, the sword of Washington, the desk of Jefferson, the Great Seal of the United States, the Declaration of Independence, national treaties, the proclamations of the Presidents and many an old flag are kept here.

The Patent Office contains half a million models of inventions. Many of historic interest have been transferred to the National Museum. The Pension Bureau, the Dead Letter Office, the Postoffice, the Navy Yard where cannon are built, the Corcoran Gallery of Art, and the Washington Monument, all are of interest. Notable among the newer buildings are the Pan-American building, Centennial Hall, the Red Cross building and the Lincoln Memorial (the latter of which see).

The national capital takes high rank as an educational center; the primary and secondary schools are entirely modern and adequate to the needs of the population. The most important higher institutions are the George Washington University, Georgetown University, Howard University, the American University and the Catholic University. Supplementary institutions are the Carnegie Institution, Geological Survey, Bureau of Standards and the Freer Art Gallery.

The population of Washington, according to the census of 1920 was 437,571. See CAPITOL; SMITHSONIAN INSTITUTION; PENSION; POSTOFFICE; PATENT; POTOMAC; ARLINGTON; MOUNT VERNON.

Washington Elm. See ELM.

Washington Monument, an obelisk erected in honor of George Washington in the city of Washington, D. C. It is a shaft of masonry 55 feet square at the base and 34 feet at the top. It is surmounted by a pyramidal top. The monument is in all 555 feet high, the loftiest work of masonry in the world. It incloses a square space or shaft. The walls are fifteen feet thick at the base and eighteen inches thick at the summit of the shaft. The outside facing is of white marble from Maryland. The interior backing is of gneiss and New England granite. The interior is lighted by electricity. Visitors may climb an inside stairway of 900 steps, if they prefer; but an elevator with a capacity of thirty passengers carries sightseers up and down the interior, stopping at several platforms.

The interior is faced with memorial stones contributed by forty different states, sixteen cities, and numerous organizations, as the Masons and Odd Fellows. Americans residing in China begged the privilege of contributing a stone. There are stones, all properly inscribed, from Braddock's Field, the battlefield of Long Island, from the loftiest peak in Washington's native state, from the ruins of ancient Carthage, from Vesuvius, from the Isle of Paros, and from the tomb of Napoleon at St. Helena. Greece sent a stone from the precious Parthenon; Switzerland a stone from the chapel of William Tell. Even far away Japan sent her tribute.

At a height of 504 feet the walls are pierced by eight openings, two on a side, from which an extensive view may be had of the city with its parks, statues, and public buildings, the White House, the Capitol, the Potomac, Arlington, and, far to the west, the misty Blue Ridge Mountains of Virginia.

The project of a national monument in honor of the first president was set on foot during Washington's lifetime. The raising of funds by subscription began in 1833. The cornerstone was laid in 1848. In 1855 the funds for the obelisk ran low, and the work was abandoned at a height of 152 feet. In 1878, after the Civil War, Congress took over the work. The monument was finished in 1885 at a total cost of $1,300,000.

Unlike some public works, it may be said that this monument is worthy of the people, the place, and the subject. A tall shaft of pure white, it may be seen long before the traveler can see any other sign of the city.

Washington, Pa., the county seat of Washington County, is on the Pittsburgh, Cincinnati, Chicago & St. Louis, Waynesburg & Washington and Baltimore and Ohio railroads, 32 miles southwest of Pittsburgh. It is in a coal and petroleum field and has manufactories of pottery, sheet and blown glass, electric furnaces, paint, tinware, steel, and tubing.

Washington is the seat of Washington and Jefferson College and Washington Female Seminary. The public schools are modern, and the educational facilities include three libraries. The population was 21,480 in 1920.

Washington, Treaty of, a treaty between the United States and Great Britain, drawn and signed at Washington, D. C., May 8, 1871, by which the *Alabama* claims were adjusted, and questions arising out of Pacific Ocean fishing rights and the Northwest international boundary were settled. Great Britain sent five representatives and the United States had five. The members of the treaty commission did not settle directly the claims of the two nations, but the treaty was the basis of their amicable adjustment.

Wasp, wŏsp, a member of an order of stinging insects allied to the bee and ant. There are in North America about 1,700 species of wasps arranged in 17 families. The wasp has two pairs of wings. The hind wing is the smaller and is fastened to the front wing by hooks. When at rest the wings of true wasps are folded like a fan. The so-called digger-wasps with flat wings make nests for their young in the ground or in the pith of elder and sumach. Other nests are built of mud in sheltered positions. The female stings a spider or some other insect until it is paralyzed, not dead, and thrusts it into her burrow. She then lays an egg in its body and retires, sealing up the burrow. Of the true wasps, the solitary or mud-wasp has the same habits. Comstock states that the solitary wasp plastered up a number of keyholes in his doors and bureau drawers one summer. Nests of the mud-wasp may be found without difficulty around houses and farm buildings. Some species bore holes into the pith of shrubs or into solid wood in which they deposit an insect and an egg, then build a partition, followed by an insect and an egg, and so on till the burrow is full.

Common social wasps build a large number of parallel cells placed like the cells of a honeycomb. These nests are built in the ground, or are attached to trees, bushes, fences, or buildings. The material of which they build is composed of lint or wood scraped fine and glued into thin gray sheets. The wasp is said with justice to be the oldest papermaker known. The entire collection of cells is wrapped with a large protective envelope of several thicknesses. Underground nests are made of yellow, brittle paper. An egg is placed at the bottom of each cell. Social wasps feed their young on insects well masticated, on sweets from flowers, and on honey dew from aphids, being in their habits between the ant and bee.

Two types of social or true wasps are familiar. The first have long, slender waists. Their paper comb hangs by a slight stem, like a wide, shallow goblet, from a ceiling or other overhead surface. The second type, known popularly as hornets or yellow-jackets, are stouter, more like a bee, and build large gray spherical nests hanging by a large neck. When they need more room they tear out a side of the nest, build on more cells, and carry a new protecting wall around the addition. Several horizontal combs are connected, and separated by fine galleries. Hornets are excellent housekeepers. The family is organized on the same plan as a colony of bees into queens, drones, and workers. Comstock adds, "The species of this genus enclose the combs of their nest with a spherical paper envelope."

See Ant; Bee.

Waste, in manufacturing, in household economy, and in the arts generally, such material as cannot be used. The use of what was formerly considered waste is one of the triumphs of modern civilization. The system of saving barnyard manure and applying it to the fields is one of the most signal instances of utilizing waste. The garbage from cities, formerly hauled away at expense and dumped as a nuisance, is now used to fertilize gardening districts. The city of Glasgow sorts its garbage carefully. A part is burned in furnaces, furnishing manufacturing power estimated at 9,000 horse-power for a day of ten hours. Formerly the smelting furnaces of Great Britain expended two and one-half million dollars in removing slag and dumping it in gullies and ravines or in the sea. A very large portion of it is now used in the manufacture of artificial brick used in the construction of buildings and for street paving. Sawdust, formerly considered a nuisance to be gotten rid of in the easiest possible manner, is now used for fuel with which to operate the mill. Mixed with alum and glue and worked with water into a dough, it is pressed in molds into artificial wood considered very desirable for woodwork. Norwegian millowners have begun its distillation for tar and wood naphtha. It is used also in the manufacture of briquettes for fuel. Managers of large slaughterhouses consider that the value of gelatine, glue, fertilizers, hair, bristles, blood, neat's foot oil, bones, horns, and hoofs, now saved from the waste pile, sufficient to pay the expense of operating their establishments.

Under improved methods, wool washers and combers expect to realize about seven-

tenths of a cent per pound from the eke or wool fat formerly allowed to go to waste. Cotton-seed, formerly thrown away, is now valued at about one-fourteenth of the entire crop. The United States imports annually about $5,000,000 worth of coal-tar colors and dyes made from material formerly thrown away. France now recards, spins, and converts into cloth half a million pounds of waste silk formerly considered worthless. Old rubbers, once thrown away, are now remelted and combined with new materials in the manufacture of the coarser fabrics, such as boot heels and the like. Tin cans are melted into window weights. Alcohol is made from the green corn cobs at the canning establishments, once thrown away. At Gary, Indiana, the gas from the iron smelters is utilized to drive thirty-three huge gas engines. This power is used to generate electricity with which to drive the shafting and pulleys of the gigantic rolling mills of the steel plant.

The baths of sulphuric acid in which millions of tons of steel plates are cleaned of grease before they are galvanized were formerly thrown away. The acid is now reëmployed as a means of purifying and clarifying reservoirs of city water. Over forty American cities, including St. Louis, have adopted the process. The old acid now sells for $1,000,000 a year. A mere list of the useful articles made from what was once considered waste would occupy pages.

Industrially, the term waste is applied to refuse from cotton and woolen mills, which is used for wiping machinery and absorbing oil in the axle boxes of cars, and for other similar purposes.

See SHODDY; GLUE; SOAP; PAPER; GALVANIZING.

Wat, the Tyler, in English history, the leader of a peasant uprising. Wat was a native of Essex, but nothing is known of his boyhood. The English peasantry were dissatisfied with their condition. The inequality between rich and poor was pointed out to open-air gatherings of the rustics by John Ball and other field preachers. In 1381 Parliament imposed a grievous poll tax that bore heavily on the poor. The demands made by Wat Tyler and his fellow leader, John Ball, seem reasonable. The peasants rose in rebellion and pressed upon London under the leadership of Wat, the Tyler. The immediate cause of the uprising was a gross insult offered by a tax gatherer to a blacksmith's daughter.

Watch, a portable timepiece. The watch was derived historically from the clock, and was rendered possible by the discovery that regularity of movement can be produced by a coiled spring of steel governed by a balance wheel, quite as well as by the use of weights and a pendulum. Watches are said to have been made in Nuremberg as early as 1477. The credit of watchmaking belongs largely to the Swiss and to the English upon whom Americans were dependent until the decade immediately preceding the Civil War. Prior to that time American watchmakers contented themselves chiefly with cleaning and repairing the timepieces of European make. The making of parts by machinery first attained a high degree of perfection in America. Machine-made watches have proved not only cheaper, but more accurate than those made by hand. In 1851 American factories surprised the watchmakers of Europe by the methods of their exhibit at the Crystal Palace Exhibition, London. They deposited machine-made parts in little heaps on a table, here a box of screws, here a pile of pivots or a heap of jewels, and showed that parts chosen at random, one from each heap, when put together without filing, bending, or tinkering, formed a watch that surpassed the finest hand-made article, not only in beauty, but in absolute accuracy of movement. The most important improvement in the manufacture of watches within the last fifty years is the change from the key to the stem winder. American factories have not attempted to compete with European watchmakers in the production of curiosities. The smallest watch in the world once belonged to the empress of Brazil. It was made in Geneva by the famous watchmaker, W. Zogelin, and cost over 5,000 guineas. It has a diameter of one-fifth part of an inch, and is set in an artistically worked finger-ring, which is studded with diamonds. Zogelin worked three years on it, and permanently weakened his eyesight in the task.

Edward Howard, the founder of the

AQUATIC PLANTS

1. Papyrus Rush
2. Water Lily
3. Arrow-leaf Pond Lily
4. Pistia
5. Victoria Regia
6. Water Hyacinth
7. Lattice Leaf
8. Water Crowfoot
9. Aponogeton
10. 11. Lotus
12. Cocoanut Palm
13. Mangrove

first American watch factory, Boston, Massachusetts, 1850, estimates that a well made watch will last fifty years and tick 7,884,000,000 times with no care beyond that of careful handling and winding once a day.

The following statistics are taken from the most recent reliable sources, and show that many people and a large amount of capital are employed in making watches.

Number of establishments	18
Capital invested	$49,000,742
Operatives	15,888
Raw material used	$6,392,562
Value of product	$32,044,299

In addition, two-thirds as much capital and over half as many people are employed in the manufacture of watch cases. The buyer of a watch pays more on an average for the case than he does for the works.

See CLOCK; HOUR-GLASS; SUNDIAL; GENEVA; WALTHAM.

Water, a common liquid. It was long considered one of the four fundamental elements—air, fire, water, and earth—but during the eighteenth century it was definitely determined that water is composed of two gases, hydrogen and oxygen, and that these elements combine in the proportion of two volumes of hydrogen to one volume of oxygen, or two parts of the former by weight to sixteen of the latter. Pure water is without color or taste. A small quantity is without color, but it is blue in the mass. Water changes the direction of slant light. Unless one is looking directly downward into the water, a fish is lower and nearer the observer than seems to be the case. Water is 770 times as heavy as air. It has its greatest density at 39.2° F. It solidifies or forms ice at 32° F. and boils or vaporizes at 212° F. The point of greatest density is important, in that cool water sinks before reaching the freezing point, thus delaying the formation of surface ice; while ice, being lighter than cool water, floats and delays the downward progress of frost. Were ice denser than water, as is the case in most corresponding liquids and solids, it would sink to the bottom as fast as made. Northern waters would freeze from the bottom up, and would never thaw out. Water is a powerful solvent, that is to say, it dissolves many substances. Even rain water and snow catch and dissolve dust in descending through the air. Ordinary water is impregnated with minerals. Arctic snow and alpine lakes in granite lake beds contain the purest water. Lime and many other minerals not only give water taste and sparkle, but are essential to the health of users. Water that contains over eight grains of mineral matter to the gallon is called hard water. It is more conducive to health than soft water, but water that contains animal or vegetable matter is dangerous.

Water combines chemically with a large number of substances. It is a constituent of nearly all minerals, even to the hardest stone, and of all vegetable and animal tissues. A table of the percentages of water in ordinary garden vegetables varies only from 89 per cent in cabbages to 96 per cent in cucumbers, and in fruits from 78 per cent in plums and 82 per cent in apples to 89 per cent in strawberries and 93 per cent in watermelons. Bananas contain 74 per cent of water, twenty-six pounds to 100 being solid food. Nuts are highly concentrated food. They contain but five per cent of water. Water forms the greater part of blood and of sap. It is the great carrier of the animal and the vegetable kingdom. The world could get on seemingly without gold, very possibly several elements might be spared, but without water all life would be a dead cinder beyond the possibility of revival. Twenty-three thirty-seconds of the earth's surface is covered with water to an average depth of between 12,000 and 13,000 feet. Ocean water contains about thirty-five pounds to the thousand of common salt. The supply of fresh water from rainfall varies from 600 inches a year in some localities to others with a mere trace.

Water occupies a large place in literature. It is employed in various religious ceremonies as baptism and sprinkling. Among the Hebrews it is the symbol of purity. Among the Hindus it is the symbol of fertility. The Taoists of China and Japan regard water as the symbol of humility, because it always seeks the lowest place. There is a common saying that "water always runs down hill."

Waterbury, a city of Connecticut and an important manufacturing center in New England. It is on the Naugatuck

River about twenty-two miles northwest of New Haven. It is the center of the brass manufacturing business of the United States, which was begun over a hundred years ago with the making of metal buttons. The geographical location of Waterbury was favorable to industrial rather than agricultural interests and before long foundries, machine shops, button factories, bottling works, publishing houses, engraving establishments, the manufacture of clocks, of the famous Waterbury watch, of lamps, and of brass kettles, etc., sprang up. The public buildings are the Bronson Public Library, the Waterbury Hospital, the city hall, the courthouse, the Masonic Temple, and the Southmayd Home for Old ladies. The Saint Margaret's School for Girls, the Immaculate Conception Academy, the Girard School, two business colleges, and a high school, represent the educational interests of the city. The town was incorporated in 1686 and chartered as a city in 1853. In 1920 the population was 91,715.

Water Color. See PAINTING.

Water Hyacinth, wa′tẽr hī′a-sĭnth, a pond weed allied to the pickerel weed, and not very far distant from true hyacinths. There are several species. The common water hyacinth is a native of Brazil. It was introduced into the St. John's River of Florida and other Southern waters on account of its beauty. It really is a handsome plant. The leaf-stalks are inflated like bladders and are filled with air. The roots are of two sorts. Those of one kind grow along the surface of the water like runners and produce new plants; the others are thickly clothed with long root-hairs and droop downward in the water like plumes. The leaves and flower stems of each plant constitute a little group that sits daintily on the water or rides before the wind like a duck. Tourists entering New Orleans by rail are charmed with the clumps of violet blue flowers and green leaves that dance on Lake Pontchartrain. The method of multiplying by runners, however, has made trouble. A central plant is soon surrounded by others, and these by others and others again, until a large floating island is formed. These masses accumulate in the rivers and bayous of the South until navigation is seriously obstructed. So much public money has been expended in clearing the channels that the water hyacinth is derided as the "million-dollar weed," and is pointed at like the English sparrow as an example of what theorists, without practical knowledge, will do by way of introducing they know not what.

Water Lily, or **Pond Lily,** the finest of aquatic plants. There are thirty-four species. The name is somewhat confused. In America it is applied to four different genera, water lilies, yellow water lilies, the lotus, and Victorias. The last named, with royal, fragrant flowers and enormous leaves, the queen of water lilies, is now a well established resident in the artificial ponds of parks. It is named for Queen Victoria and comes from the upper Amazon. The leaves widen occasionally, it is said, at the rate of an inch an hour, attaining a diameter of two to six feet, with edges turned up like a basin. One of the largest leaves is said to be capable of sustaining a weight of 150 to 200 pounds. Our best known flower is the common, deliciously fragrant, white water lily of ponds and lake borders. A rosy variety is found on Cape Cod and a slender variety two inches across has been found in northeastern Minnesota and elsewhere. The moose and the muskrat eat water lily roots.

Waterloo, the county seat of Blackhawk County, Iowa. The city is fifty-three miles from Cedar Rapids, and is on the Red Cedar River. The surrounding region is devoted to agriculture and stock-raising, and in addition to the city's being a central shipping point for grain, it has establishments manufacturing agricultural implements, automobiles, gas engines, cream separators, etc., also foundries, canneries, and packing-houses. It has two high schools, a business college, Our Lady of Victory Academy, a Presbyterian hospital, a government building, and a courthouse. The town was settled in 1845, incorporated in 1868. The population, composed largely of American-born Germans, Irish, and Scandinavians, numbered 36,230 in 1920.

Waterloo, the final battle in the Napoleonic wars. It was fought June 18, 1815, near the village of Waterloo, a few miles south of Brussels. When Napoleon

escaped from Elba the representatives of the allied powers of Europe were in session in the Congress of Vienna. They caught breath and branded Napoleon as "an enemy and disturber of the peace" of the world. A new coalition was formed and 700,000 men were put in the field under the English Wellington and the Prussian Blucher, the former with headquarters at Brussels and the latter at Namur. Napoleon raised an army of 500,000 men, and hastened to confront his enemies before they invaded France. He attempted to wedge himself between the English and the Germans to defeat them in detail before they could effect a junction. In several preliminary skirmishes Napoleon was successful; in the decisive struggle, however, he lost. While the French Grouchy with 33,000 troops was hunting for Blucher, supposed to be retreating, Napoleon fell on Wellington. The English regiments withstood the fiercest assaults. Marshal Ney and the flower of the French cavalry were repulsed. The Old Guard held in reserve staked their lives and lost in a terrific charge on Wellington's center. Grouchy had been signaled to return, but was too far away. Blucher and his marching battalions of black-browed Prussians appeared on the battlefield at nightfall. Wellington ordered a general charge and all was over. Thirty-three thousand Frenchmen and 23,000 of the allies lay on the battlefield killed or wounded, or were reported missing. Napoleon galloped away to Paris with a few companions. June 22d he abdicated. He was sent to St. Helena to end his days, and the Congress resumed its work at Vienna.

About 200,000 men were engaged in the battle. The magnitude of the movements, the skill of the commanders, the momentous issues involved, the desperate bravery shown on both sides, and the decisiveness of the victory render Waterloo one of the most memorable battles in history. The gathering odds were too great for Napoleon. Even though he had won he must have been beaten at the end. France single-handed could not withstand Europe. It was a foregone conclusion that Napoleon was to "meet his Waterloo" sooner or later.

See BLUCHER; WELLINGTON; NAPOLEON; NEY.

Watermelon, a running fruit-bearing vine of the gourd family, closely related to the cucumber, pumpkin, and squash. A native of tropical Africa. The African is traditionally fond of a watermelon. It would be an aggravation to describe its cool green rind or luscious red and pink flesh. Watermelons are raised successfully from Ontario to Texas, but reach their greatest development in Georgia, where an official record gives the weight of an extreme specimen at one hundred twenty pounds. Melons of thirty to fifty pounds are large. Under modern systems of cultivation, large raisers locate near railroads and have temporary tracks laid out into the melon patch. Car lots are shipped in bulk; small lots are reshipped from wholesale centers in crates. Shippers' unions aim to direct shipments judiciously. The famous Muscatine watermelon is raised on an island in the Mississippi. The citron is a solid spherical melon used only for pickles and preserves.

See IOWA; GEORGIA; GOURD; MUSKMELON.

Waterpower, a term applied to force derived from a waterfall. The clattering waterwheel driven by a swift current or by a weight of water falling heavily through a flume is an ancient invention. The water rights of the miller who first controls the water of a fall and uses it to turn his mill have been protected by common law and by statute. To draw off in another direction the water that flows to the miller's wheel is as much an act of theft as to take a horse from his stable or a sack of meal from his bin, and, indeed, it is a far more serious affair.

It is frequently possible to increase the height of the fall or to convert mere rapids into a waterfall by throwing a dam across the stream. If this be done while the country is in a primitive condition, the entire millpond becomes the property of the miller, but if the owner of a mill desires to form or enlarge a pond after the shore has passed into the possession of others, he must purchase their consent.

The more water and the higher the fall, the greater the power furnished. The force of 33,000 pounds of water falling one foot is taken as the unit. It is considered equal to the strength of a horse and is called a

horse-power. One tenth as much water descending ten times as far gives the same power. The weight of water is 62½ pounds per cubic foot. If we multiply 62½ pounds by the number of cubic feet that pour over a fall per minute, we shall have the weight of the water. Multiplying this weight by the height of the fall and dividing the result by 33,000 gives the number of horse-power. There are other considerations such as the angle of striking and loss from friction that need not be stated here. The discussion of waterwheels, overshot, undershot, and turbine; of tailraces, aqueducts, strength of dams, head, water meters, loss of power in transmission, etc., is an interesting subject well taught in colleges of engineering.

Falling water is one of the cheapest sources of power known. By evaporating the water of the sea and causing it to form clouds that supply the sources of the stream with showers and rains, the sun may be said to lift the water day by day and thus drive the mill. Waterpower is more trustworthy than the power of the wind. Wind does not blow always when it is wanted, nor can it be regulated as easily by the miller who turns on and shuts off the water from his millpond.

Millponds are widely distributed. The rougher and better watered the country, the more waterfalls there are. The more thickly a country is inhabited, the more likely the falls and rapids are to be utilized. Many important falls in the unsettled parts of the country are not yet in use. Some of the important waterpowers of the country are:

Place.	Horse-power.	Fall, ft.
Austin, Texas	10,000	68
Columbus, Georgia	10,000	26
Great Falls, Montana	16,000	40
Helena, Montana	10,000	38
Holyoke, Massachusetts	14,000	50
Lawrence, Massachusetts	11,000	30
Lewiston, Maine	11,900	55
Lowell, Massachusetts	11,845	35
Manchester, New Hampshire	12,000	54
Minneapolis, Minnesota	15,500	50
Sault Ste. Marie, Ontario	10,000	15
Spokane, Washington	18,000	72
Turner Falls, Connecticut	10,000	35
Niagara Falls (1861)	15,000	95
Niagara Falls (1894)	50,000	176

Keokuk Dam. The largest single hydroelectric plant in the world is at Keokuk, Iowa, where a dam across the Mississippi River was completed in 1913. The plant has a capacity of thirty turbine wheels and when fully developed will supply 300,000 horse power. The power is transmitted to Saint Louis, 145 miles distant, and to various smaller cities in Illinois and Iowa. The capacity of the combined power plants at Niagara Falls is equal to that of the Keokuk plant. Other large plants are found at Sault Ste. Marie, Minneapolis, and at Great Falls and Helena, Montana, Shoshone Falls, Idaho, is a good example of many great waterpower sites on the mountain streams of the Northwest.

The available waterpower of the United States is estimated at 200,000,000 horse power and less than one-fourth of it has been developed. The application of electricity to the operation of machinery has made available thousands of waterpower sites that were formerly useless because of their location, and most of these sites are awaiting development.

The Federal Water Power Act, approved in June, 1920, places all waterpower sites on navigable streams and on government reservations under the control of the Federal Water Power Commission, consisting of the Secretary of War, the Secretary of the Interior and the Secretary of Agriculture. The water power sites under government control are safeguarded by laws intended to prevent their control by monopolistic corporations, and this commission is empowered to examine all applications for waterpower sites under their jurisdiction and to issue licenses to the applicants or to deny such licenses when conditions warrant such denials.

Waters, Mineral, water containing considerable mineral matter in solution. Absolutely pure water is so rare that in one sense of the word, all waters are mineral. Hard water is understood to be water that has taken up appreciable quantities of lime or magnesium. Teakettles in which hard waters are boiled become encrusted with a mineral deposit. Ocean water is a mineral water, being so impregnated with salt as to be called salt water. Mineral waters, so called, may be artificial or natural. Ordinary aerated waters are made by charging water with from two to four times its own

volume of carbonic acid gas derived from the action of vitriol on chalk. The charged water is corked tightly until desired for use. Ordinary water thus aerated is popularly described as "sodawater," although soda is seldom present in the beverage. Many distilled or pure waters are aerated and sold under a variety of names.

Natural mineral waters are obtained from springs. They have absorbed mineral ingredients from the rocks through which they flow. Some of the most celebrated are Apollinaris, from a spring in the valley of the Ahr in Prussia, containing salt, carbon, soda, and lime; Vichy, an alkaline water, from springs at the foot of the volcanic Auvergne Mountains of France; waters from springs at Carlsbad, Germany, are taken as a remedy for rheumatism, gout, catarrh, and overweight; and waters from Seltzer in Nassau have been counterfeited until the term is as meaningless as sodawater. American waters of at least local note are those of Blue Lick, Kentucky; Ballston, Saratoga, and Sharon Springs, New York; Crab Orchard, Kentucky; Bethesda water of Waukesha, Wisconsin; Buffalo lithia water of Mecklenburg County, Virginia, etc. The sulphur waters of Hot Springs, Arkansas, are noted for the cure of rheumatism and skin diseases.

See AACHEN; HOT SPRINGS.

Waterspout. See WHIRLWIND.

Water-Strider, a slender, long-legged bug noted for the lively way in which it circles around on the surface of wayside pools. It has a slender body and a wonderfully agile movement. A swarm of these insects will rest motionless until approached, when they set up a whirling dance, circling around each other so rapidly that they seem almost like ripples. The striders live on other insects. They may be seen to leap into the air to catch a passing midge. They glue their eggs to the stems of aquatic plants. In winter they seek shelter under stones or a projecting bank.

Watertown, an industrial city in Middlesex County, Mass., is on the Charles River and on the Boston & Maine Railroad, six miles west of Boston. The leading products of the manufactories are shirts, woolen goods, waste, shoddy, soap, rubber goods, starch, stoves and furnaces.

Watertown has good schools, a library, an arsenal, a park and attractive municipal buildings. It was founded in 1630, and two years later, when called upon to furnish a part of the money for the erection of a fort at Cambridge, made the first protest in the American colonies against arbitrary taxation. The second and third Massachusetts provincial congresses met here, 1775-76. Population, 1920, 21,457.

Watertown, N. Y., the county seat of Jefferson County, is an industrial city situated on Black River and on the New York Central & Hudson River Railroad, 73 miles north of Syracuse and 10 miles east of Lake Ontario. Near the city are deposits of limestone and iron, and hydro-electric power is available. The city's manufactories produce ammunition, paper, wood pulp, lumber, agricultural implements, wagons, air brakes and machine shop and foundry products.

Attractive features are the city and county buildings, Henry Keep Home for the Aged, two orphans' homes, City Park (600 acres), Federal building, Roswell P. Flower Memorial Library, Masonic Temple and the Y. M. C. A. Population, 1920, 31,285.

Water Turkey. See ANHINGA.

Waterville, Me., is on the Kennebec River and on the Maine Central Railroad, 81 miles north by east of Portland and 18 miles northeast of Augusta, the capital. Railroad shops, cigar and furniture factories, cotton and woolen mills, tanneries, and manufactories of iron, shirts and boats are the leading industrial plants.

Waterville is the seat of Colby College and the Colburn Classical Insttiute, and has modern public schools and a Carnegie library. It was founded in 1764 and until 1802 was a part of Winslow, a town on the opposite side of the Kennebec. In 1920 the inhabitants numbered 13,351.

Watervliet, N. Y., a manufacturing city situated on the Hudson River opposite Troy, with which it has bridge and ferry connections. It is served by the Delaware & Hudson Railroad. The largest manufacturing establishment is the United States arsenal, erected in 1807. Large calibre rifles are the principal product of this plant, though other war materials are also

made. Iron, wagons, automobile accessories, collars, bells, harness and woolen goods are other products of the city's factories. Population in 1920, 16,063.

Waterworks, a term applied to a system of pumps, tanks, and pipes designated to furnish a supply of water. By living along the shores of fresh waters a sparse population may get on very well without waterworks. Springs and surface wells furnish a supply in a farming country, but a town cannot reach any considerable size without the need of bringing water from outside, sometimes from a great distance. Drinking water may indeed be carried on donkeys, as is yet the case in many oriental cities, but some more extensive supply is required for general purposes.

How to secure an abundance of water is one of the problems of civilization. Four general methods of supply are in vogue.

1. Bringing the water in mains or aqueducts from high distant sources, usually lakes or artificial reservoirs like millponds situated on high ground. The natural weight of water running down hill gives sufficient pressure. Jerusalem obtained water in this way from "Cool Siloam's shady rill," Hebron, and Bethlehem; Athens, from Mounts Hymettus and Pentelicon. No less than nine aqueducts brought water from the spurs of the Apennines to ancient Rome. Three of these still supply the modern city. As early as 1613 London began to bring water from higher ground. Manchester brings 50,000,000 gallons a day from Lake Thirlmere, 100 miles away in Cumberland. Glasgow depends on Loch Katrine, twenty-six miles distant. New York draws its supply from the Croton River and other sources thirty odd miles up the Hudson. Boston brings in water from high land in two directions. Baltimore, San Francisco, St. Paul, Seattle, and many others may be added to the list.

2. A second method of securing pressure is that of raising water by pumps into artificial reservoirs where it may settle, and if need be, pass through sand filters. Sufficient head for domestic purposes can be secured in this way. In 1562 sixteen force pumps driven by a current wheel were set at work to pump Thames water into a reservoir 120 feet above tide. From this reservoir water was delivered through lead pipes to houses in the immediate vicinity of London Bridge. The first reservoir of this sort in the United States is said to have been built at Bethlehem, Pennsylvania, about 1760. Water was driven by a five-inch force pump through pipes bored in hemlock logs up into a reservoir seventy feet above the streets. Of American cities, Cleveland, Cincinnati, Philadelphia, Pittsburg, St. Louis, Louisville, Omaha, Kansas City, and Minneapolis draw water from elevated reservoirs filled by force pumps.

3. A third method is that of forcing water from the source of supply as a lake, well, or river directly into the waterpipes of the city. The pressure in a house pipe is thus derived not from gravity but from the piston of a steam pump. Waterworks of this sort force water from twenty-five deep limestone wells into the pipes of Indianapolis. Dayton and Columbus, Ohio, employ the same method of obtaining pressure.

4. The fourth method of obtaining pressure or head is like the second only on a smaller scale. Water is pumped up into standpipes or elevated tanks. This is the usual plan in level districts. Chicago, Detroit, and Milwaukee follow this plan, water being secured through intake pipes running far out into the lake beyond danger of shore contamination. In Syria buckets are attached to waterwheels driven by the current. They fill in passing through the water and empty into a trough as they descend. Thus the stream scoops a part of itself up into a cistern from which water is drawn for irrigation. Some of these creaking, groaning, dripping wooden wheels are eighty or ninety feet in diameter. In the smaller towns of our Western prairies, the round watertower or public tank is elevated on wooden or iron trestle work. It is the most conspicuous object in the horizon. It is higher and can be seen farther than the grain elevators. Railroads follow this method ordinarily.

Whatever the source from which water is obtained, the system of distribution is much the same, usually through underground watermains, service pipes, and house fixtures. The mains are constructed usually

of cast-iron pipes made in sections, which are laid end to end in a ditch, cemented, and then covered again. Large valves at intervals enable those in charge to shut water out of any portion while repairs or alterations are being made. These mains are sometimes so large that an average person can walk through them without stooping. To prevent rusting, they are often coated outside and in with a mixture of coal tar and asphaltum. House pipes are made usually of lead. Outdoor pipes or hydrants, usually at street corners, supply water for street sprinkling and fire engines. Consumers are charged either so much a quarter, according to the size of the house, that is to say, the evident demand for water; or else the charge is fixed at a price per 1,000 gallons. In the latter case the amount used is determined by a water meter placed in a box in the pipe through which the water enters the house. The current of water turns the blades of a delicate wheel connected with wheelwork and dials. The more water used the oftener the wheel turns and the greater the advance of the indicators on the dials. Over one-half of the waterworks of the United States are owned by the public. Of 1,475 systems reported recently, 661 were owned and operated by private companies.

Water from the Catskill mountains was introduced into New York City in 1917. Before that the supply in Manhattan and the Bronx was drawn from the Croton watershed, with a little from the Bronx and Byram watershed; the supply in Queens and Richmond boroughs was drawn from local Long Island sources, and Brooklyn derived most of its water from wells, ponds, and springs out on Long Island. Private water companies still supply water in the boroughs of Brooklyn and Queens, but Brooklyn is now also supplied from the Esopus watershed. The new Catskill Mountain water supply for New York is a gravity system, and the available drainage areas are capable of furnishing 600,000,000 gallons of water daily throughout the year. The total consumption of water in Greater New York in 1921, including that supplied by private water companies, was 731,300,000 gallons daily. The city tunnel is the longest in the world for carrying water under pressure. The cost of the portions of the Catskill aqueduct within the city limits, including the tunnel, which reduces from 15 to 11 feet in diameter and is 18 miles long, with pipe lines, appurtenances, and Silver Lake reservoir, was $26,400,000.

The waterworks system of Chicago is supplied from Lake Michigan, by means of lake and land tunnels and pumping stations. In 1921 the total number of gallons pumped per day was 788,000,000. There are six waterworks cribs located out in the lake, the farthest at a distance of four miles from the shore. The average supply of water per head of population is the most liberal in the world, averaging about 260 gallons a day for every man, woman and child in the city. The nine tunnels from the cribs in the lake to the pumping stations on shore range from 5 to 14 feet in diameter.

The preservation of the purity of water for domestic use is of great importance to the welfare of the nation. A consideration of this subject, as well as of navigable waterways, canals, irrigation, and water powers, emphasizes the absolute necessity for competent supervision of the natural water resources of the country. The flow of water in many streams annually fluctuates between wide limits. The low-water periods limit the profitable water-power development and the high periods often cause disastrous floods. Little has yet been done to conserve the supply, and the expensive waterworks necessarily constructed by many cities and towns to secure an adequate supply simply tend to emphasize this fact. On most streams the average flow for the year is many times the minimum flow. It is possible in some cases to utilize a flow approximating the average by constructing controlling reservoirs on the headwaters of the streams.

The Great Lakes form a natural reservoir of this kind for the Niagara River. The upper Mississippi has great natural reservoirs which assist in regulating its flow and which could easily be made effective in its control. The notable floods of the Ohio River can be greatly reduced by the con-

struction of controlling reservoirs on its headwaters which would result in saving millions of dollars of property that have been annually destroyed; and something is being done to that end, though not by any means all that is possible.

The surplus waters are next in value to the land; they are self-replenishing, renewing themselves in the seasons and throughout the years; they are a part of the public domain which has never been segregated, and should be held forever for the use of the people in common. From the point where they come to earth, in their descent to the sea, they develop energies many times greater than can be produced by high-grade engines from all the coal mined in the United States. They are well worth conserving for the power that will be needed in the development of industry, as well as to secure a lasting and liberal supply of pure water for the people's domestic use.

Water conservation demands storage, and 4 to 6 per cent of the area in reservoirs will equalize the flow of streams. By fish culture, such reservoirs would have greater value than the land taken for the purpose. Reservoirs add to the landscape, and make places of recreation for the people. Floods would be abolished or mitigated, thus reclaiming the wealth in alluvial lands along the watercourses and making the valleys salubrious. The flow of streams would be equalized and made navigable throughout the year, even to the more remote reservoir sites, and by improvement of these natural channels and by connecting the water systems at vantage points, a great transportation agency might be evolved as a supplement to our railway system, and as a necessity for our larger growth and more complete development. Forestry becomes the incident of water conservation and makes wealth out of the waste lands which have no better use.

Thus through water conservation, which has been sadly neglected in the United States, like other natural resources, an abundant supply for every-day use may be assured; it is possible to develop power in every region where people can live, and prolong the life of the coal mines throughout the generations; protect from floods, reclaim the wealth in alluvial lands by the water-side; and make the valleys healthful; produce a great transportation such as is necessary to realize the national destiny, and create wealth in fisheries and in forests from land which has no better use. The remedy is far-reaching and automatic, and thus lends itself best to the nature of American institutions. The more plentiful supply of pure water that might be obtained would obviate the necessity for expensive waterworks in many cases.

See WATER; AQUEDUCT; SIPHON; PUMP; MUNICIPAL OWNERSHIP.

Watling Street, a famous military road built by the Romans in Great Britain. It started at Dover and led northwestward through Canterbury and London along the boundaries of the present counties of Leicester and Warwick to Chester on the Dee. It may be described as a military road leading across country from the Strait of Dover to the Irish Sea. Branches led to York, Carlisle, and Newcastle. It was substantially built. Traces are still in existence. Portions of the old roadbed are still important highways. A street in London retains the name. By the treaty of Wedmore, concluded by Alfred the Great in 1885, Watling was made the boundary between his Saxon kingdom of the south and the Danish kingdom of the north. See ROAD.

Watson, John (1847-), a Canadian philosopher, was born at Glasgow and educated at the University of Glasgow. In 1872 he received the appointment of professor of logic, metaphysics and ethics at Queen's University, Kingston, Canada. Professor Watson has been called an intellectual idealist, and one who has done much constructive work in the field of philosophy. His writings include: *Schelling's Transcendental Idealism; The Philosophy of Kant as Contained in Extracts from His Own Writings; Comte, Mill and Spencer; An Outline of Philosophy,* and *The Philosophical Basis of Religion.*

Watson, John (1850-1907), an English Presbyterian clergyman and author who used the pen name of Ian Maclaren. He was born at Manningtree, Essex. He was educated at Edinburgh University and at the University of Tübingen. He was lo-

WATT DISCOVERING THE POWER OF STEAM

From the Painting by Marcus Stone

cated at Edinburgh, Logiealmond, Glasgow, and Liverpool, respectively. He has written several religious works, among them *The Mind of the Master, The Upper Room,* and *The Potter's Wheel.* The work for which Watson is best known is a series of sketches of life in Highland parishes, *Beside the Bonnie Briar Bush.* It was followed by *The Days of Auld Lang Syne,* a book of similar character. See BESIDE THE BONNIE BRIAR BUSH.

Watson, William (1859-), an English poet. He was born in Yorkshire. He was educated in private. He began publishing verses as early as 1880. He has been influenced noticeably by Keats, Morris, Rossetti, Wordsworth, and Tennyson. Several volumes of verses have appeared. One of the more noted, *The Purple East,* appeared in 1897. A selection of his best work was published in 1898 under the title of *Collected Poems.* One of his best bits of writing is the following, expressive of the permanence of the poetic art:

Yet do the songsmiths
Quit not their forges;
Still on life's anvil
Forge they the rhyme.

Lo, with the ancient
Roots of man's nature
Twines the eternal
Passion of song.

Ever Love fans it,
Ever Life feeds it,
Time cannot age it,
Death cannot slay.

. . . . . .

God on his throne is
Eldest of poets:
Unto his measures
Moveth the whole.

Watt, James (1736-1819), a Scotch inventor. He was a native of Greenock. He was educated for the trade of making mathematical instruments. He spent some time in London shops studying for this purpose. He was accounted an ingenious, skillful workman. He opened a shop on his own account in Glasgow. He was appointed instrument maker by the University of Glasgow. He obtained employment also in making surveys and in preparing reports on canal, river, and harbor improvements for the government. He became interested in the crude steam engines of the day. In 1769 he took out a patent for a separate receptacle in which to condense the steam. In this way he became the inventor of the modern steam engine. Five years later he formed a partnership with a manufacturer of Birmingham and was instrumental in building up the most noted engine works in the world. He was an inventive man. He interested himself in such problems as a fuel-saving furnace, copying ink, and the chemical composition of water. He was also what might be termed a learned man, having read widely in chemistry, physics, architecture, and even in music and law. He was elected a fellow of the Royal Society of London and the Society of Edinburgh. He was also a member of the National Institute of France. His work on the steam engine entitles him to a place in the list of the world's great inventors. The modern unit of electrical activity has been named the watt in his honor, 746 watts being equal to 1 horse-power. A statue in his honor has been set up at Birmingham. The oft told tale of the boy James getting an idea from the dancing lid of his mother's tea-kettle appears to have no foundation. See STEAM ENGINE.

Watterson, Henry (1840-1921), an American journalist. He was born in Washington, and began his journalistic work on the Washington *Star.* He served in the Civil War, and when the war was over he revived the Nashville *Republican Banner.* In 1867 he went to Louisville and became editor of the *Journal.* This he consolidated with the *Courier,* and the new *Courier-Journal* has grown to be one of the chief newspapers of the South. He has been a stanch member of the Democratic party, has served in Democratic national conventions from year to year, and was elected to Congress in 1876. His editorials have attracted attention by their frank sincerity, and he has insistently urged conciliation between the North and the South. He has written: *Oddities of Southern Life and Character, History of the Spanish-American War,* and *Abraham Lincoln.*

Watts, George Frederick (1817-1904), an English painter. He was born in London, studied in the Royal Academy and in Florence, and began to exhibit at

an early age. He became a member of the Royal Academy in 1868 and was placed on the retired list in 1896. He achieved great success in portrait painting, and was an idealist and poet in his treatment of landscapes and allegorical themes. He came under the influence of Titian and Tintoretto during his stay in Italy. He also painted in fresco, and many prominent buildings in London are adorned by his mural art, as well as by the portraits of prominent men who sat to him during his busy career. Many distinctions and medals were bestowed on him. Prominent among his paintings are the following: Portraits of *Tennyson, Browning, Swinburne, Gladstone, John Stuart Mill,* etc.; *Love and Death, Sir Galahad, Orpheus and Eurydice, Echo, Alfred Inciting the Saxons to Prevent the Landing of the Danes.*

Watts, Isaac (1674-1748), an English Congregational clergyman and writer. He was born at Southampton and died at London. From 1702 until the time of his death he was minister of the Congregational chapel in Mark Lane, London. His congregation was an influential one. Watts himself had greater popularity as a writer than as a speaker. He wrote about 600 hymns, many of which are still popular in church hymn books. He is best known, however, by his *Divine and Moral Songs* for children. Together with the Westminster Shorter Catechism they have held a large place in the religious teaching of English-speaking children. Among the better known hymns for children are the two beginning:

'Tis the voice of the sluggard; I heard him complain,
"You have wak'd me too soon, I must slumber again."

And

How doth the little busy bee
Improve each shining hour,
And gather honey all the day
From every opening flower!

Waukegan, the county seat of Lake County, Ill., is on Lake Michigan and on the Chicago & Northwestern and the Elgin, Joliet & Eastern railroads, 36 miles north of Chicago. With the latter city and with Milwaukee and other points north it is connected by freight and passenger boat lines, interurban electric railroads and Sheridan Road, an automobile highway. Waukegan has manufactories of iron and brass, wire fence, motors, sash and doors, boats, leather, sugar, foundry and machine shop products and women's clothing.

The city and county buildings are attractive, and there is a Federal building, Masonic Temple and Carnegie library. Bowen Country Club, the summer camp of Hull House, Chicago, is located here, and the Great Lakes Naval Training Station is situated south of the city. In 1920 the population was 19,226.

Wausau, Wis., the county seat of Marathon County, is on the Wisconsin River and on the Chicago & Northwestern and Chicago, Milwaukee & St. Paul railroads, 180 miles northwest of Milwaukee. The city has extensive commercial interests, and from its factories issue paper, cereal foods, flour, canned vegetables, leather, sash, doors, blinds, boxes, veneer, furniture, sawmill machinery and toys. Granite is quarried in the vicinity.

Wausau is the seat of Marathon County Training School for Teachers, County School of Agriculture and Domestic Science and a county insane asylum. Other institutions are St. Mary's Hospital and Wausau Memorial Hospital, a county home for the poor and a tuberculosis sanitarium. There are good schools supplemented by a public library. Population, 1920, 18,661.

Wave, an undulation or swell in the propagation of energy as the result of a vibratory motion in some elastic medium. There are waves in solids, as in the earth at the time of an earthquake shock; in liquids, as the familiar waves of the water resulting from wind or from throwing a body into the water; in the air, as sound; and in ether, as light and electrical waves. Though so different in character all waves have one distinguishing feature. The motion of the wave is wholly distinct from that of the particles composing it. In sound, for instance, the individual air particles move forward and backward in a very limited path, while the wave moves right along; there is no sensible onward motion of the air. In the waves of a body of water, though they progress with considerable velocity, the water itself simply rises and falls. When such a wave

reaches shallow water, however, the lower part is retarded and the top "breaks" and flows in over the beach, from which one may get the erroneous impression that the water of a wave actually moves along with the wave.

Waverley. See SCOTT.

Wax, a solid smooth surface of either animal or vegetable origin, of which the best illustration is the common beeswax. This is yellow in color, with a peculiar agreeable smell. It has various uses, as in candles; for glazing or polishing; as a covering to prevent rust and mildew; for making moulds; and for artificial flowers or wax figures. Numerous vegetable waxes are used as a substitute for beeswax, as from the wax-myrtle or bayberry tree, the candleberry or tallow tree, certain wax palms found in South America, or Japan wax, obtained by boiling the seeds of a sumac of that country. A mineral or fossil wax known as ozocerite is found in large deposits in Utah. The purified form, ceresin, can be used instead of beeswax for many purposes. See BEE.

Waxwing, a family of perching birds. Two species are well known in the United States and Canada. The cedar-bird or cedar-waxwing is a common American bird. It nests from Kentucky northward. It is a beautiful bird with a graceful crest. Its general color is ashy brown, with a purple tint on the head. Its throat is black; the tail feathers are tipped with yellow. The wings bear a bar of white, at the crossing of which each feather has a peculiar appendage, looking like a bead of vermilion sealing-wax. In the northern woods the cedar birds are to be found usually in the thick foliage of evergreen trees. They feed on berries. The nest is placed in a tree from five to twenty feet above the ground. There are usually from four to six pale blue, thickly speckled eggs. The cedar-bird is a trifle over seven inches in length. The Bohemian waxwing ranges farther westward. It is about eight inches in length. It is an exquisite dresser. The general color of the upper parts is a rich grayish brown. The under parts vary from gray to chestnut. It has a jaunty topknot. Its wing feathers are barred with white and end in small red sealingwax-like tips. "I think that the Bohemian waxwing," says William T. Hornaday, "when alive and in perfect plumage, is one of the most exquisite perching birds I know. It is not gorgeous or resplendent; but in dainty prettiness of form, immaculateness of plumage, and delicate refinement in color-scheme combined, it has few equals."

Waycross, the county seat of Ware County, Ga., is on the Atlantic, Birmingham & Atlantic, Atlantic Coast Line, Waycross & Western and Waycross & Southern railroads, 96 miles southwest of Savannah. It is the commercial center of an agricultural region producing an abundance of cotton, sugar cane, pecans, live stock and fruit; cypress lumber, turpentine, cabinets, shingles, lath and cotton-seed products are the leading manufactures.

Waycross has good city and county buildings, a Y. M. C. A., a high school, Piedmont Academy, Bunn-Bell Institute and the King's Daughters' Hospital. The 1920 population was 18,068.

Wayne, wān, **Anthony** (1745-1796), an American soldier. He was a native of East Town, Pennsylvania. He was educated as a land surveyor, but settled down to farming. In 1774 he was elected to the legislature of Pennsylvania. He was a warm supporter of Benjamin Franklin's measures. He is still one of the picturesque figures of the Revolutionary War. He took part in the expedition of 1775 into Canada. He held Ticonderoga until forced back by the British forces. He distinguished himself for bravery at the battles of Brandywine and Germantown. In the winter of 1778 he raided the British lines, bringing away a large quantity of supplies much needed by the American forces. On the night of July 15, 1779, he stormed the fortress of Stony Point, a most gallant and heroic act, for which he received a gold medal and the thanks of Congress. These daring exploits won for him the name of "Mad Anthony." During the closing years of the war he was active in Georgia and South Carolina. At the close of the war he resumed his seat in the legislature of Pennsylvania, but later he accepted a plantation as a gift from the state of Georgia

and settled there. In 1792 he was appointed commander of the American forces to chastise the Indians of the northwest. The defeats of General Harrison and St. Clair had left the pioneers at the mercy of hostile Indians. Wayne acted with his usual promptness and energy, driving the Indians as far as Fallen Timbers at the rapids of the Maumee. Here he concluded a treaty of peace which relieved the frontiersmen from attacks of the Shawnees for all time. On his return he died at Erie.

Weald Clay, in geology, the upper series of strata of the British Wealden Formation. It is about 1,000 feet thick, and excepting its upper portion, is of fresh-water origin. It constituted the delta of a large river, which slowly subsided and let in the ocean. This delta was inhabited by great saurians, and these, becoming submerged as the delta sank, became imbedded in the overlying Kentish Rag, which succeeded the clay. Throughout the clay itself there are occasional bands of Sussex marble. The Weald Clay constitutes a valley between the elevated ridges of the Hastings Sand and the chalk downs of Kent, Surrey, Sussex and Hampshire.

Wealden, in geology, a formation of rocks consisting of clay, sand, sandstones, shale, grits and limestone, forming the lowest part of the Cretaceous System. The name Wealden Formation, was introduced by Dr. G. A. Mantell, since the formation was originally studied in those sections of Kent, Surrey and Sussex called the Weald. It was divided into two series, differing but slightly from each other: Weald Clay, 560 feet; Hastings sand, 540. This formation was deposited in an inland sea, which covered a large portion of southern England and also extended into Germany. The thickness of the true Wealden Formation in Swanage Bay, where it is most highly developed, is sometimes 2,000 feet. Its fauna consists of large reptiles, fishes and fresh-water mollusks. The flora consists of cycads, conifers and ferns, with but few angiosperms. The Quorra, or Niger, in Africa, covers 25,000 square miles.

Wealth, the term popularly applied to riches, or valuable material possessions; in political economy, to all objects possessing value, or the power to command other commodities in exchange. Thus things for which nothing could be obtained in exchange, however useful or necessary they may be, are not wealth, says John Stuart Mill, in the sense in which the term is used in political economy. Wealth, or objects possessing value, may also be defined as "those things, and those things only, which are transferable, are limited in supply, and are directly or indirectly productive of pleasure or preventive of pain." Active wealth, or active capital, is money or property that may be readily converted into money, used in commerce or otherwise employed.

Wealth being based on value, it is well to remember that economic value is the capacity of a commodity or service to increase human well-being, either through the direct satisfaction of wants or through the power of producing, or commanding in exchange, commodities or services which directly satisfy wants. As a rule the term wealth is confined to objects which are useful, limited in supply, and transferable, or capable of being exchanged. Some authorities include personal services under the designation of wealth, while others also include such personal attributes as health, strength, and intelligence; but the use of the term is commonly confined to objects of value, outside of the human personality.

The amount of wealth which comes into existence in a fixed period of time, or the income for that period, is sometimes called by economists the "wealth-flow"; while the aggragate of wealth which exists at a given moment, as contrasted with the income which comes into existence in a given time, is known as the "wealth-fund," or total of available capital.

The national wealth of the United States, according to the most recent estimate by the Census Bureau, is placed at $187,739,000,000, or $1,965 for each man, woman, and child in the country. The total includes the value of all kinds of real, personal, and other property, taxable and exempt, in the United States, exclusive of Hawaii, Porto Rico, Alaska, and the Philippines. This national wealth does not include the value of undeveloped natural

resources, but is classified as follows: (a) real property and improvements taxed; (b) real property and improvements, exempt; (c) live stock; (d) farm implements and machinery; (e) manufacturing machinery, tools and implements; (f) gold and silver coin and bullion; (g) railroads and their equipment; (h) street railways, telegraph and telephone systems; (i) Pullman and other cars not owned by railroads; (j) shipping and canals; (k) irrigation enterprises, waterworks, and central electric light and power stations; (l) other property of value, including agricultural products, manufactured products, imported merchandise, mining products, clothing and personal adornments, furniture, carriages and kindred property.

In July, 1919, the Journal of the Royal Statistical Society, London, published the following estimate of the wealth of the nations specified in 1914, the year when the World War began:

Country	Total	Per capita.
United States	$204,393,000,000	$2,063
United Kingdom	70,564,000,000	1,548
Germany	80,540,575,000	1,187
France	58,398,000,000	1,475
Italy	21,801,920,000	623
Austria-Hungary	30,172,300,000	589
Spain	14,307,510,000	701
Belgium	5,839,800,000	764
Holland	5,109,628,000	813
Russia	58,398,000,000	414
Sweden	4,574,510,000	818
Norway	1,070,630,000	438
Denmark	2,433,250,000	857
Switzerland	3,893,200,000	998
Australia	7,445,745,000	1,548
Canada	11,119,953,000	1,460
Japan	11,679,600,000	214
Argentina	11,679,600,000	1,655

Wealth of Nations. See SMITH, ADAM.

Weasel, a small animal of the marten family. There are a dozen or fifteen species. The least weasel, an inhabitant of the country northwest of Hudson Bay, is the smallest carnivorous animal known. The common weasel is brown in summer and white in winter, save that the tip of the tail is black. As a foe of the poultry yard the weasel is worse than a mink. The body is so slender that the little murderer can go through any hole that will admit its flat, wicked head. It does not hestitate to seize chickens, ducks, and rabbits by the throat, and will kill seemingly for the ferocious love of killing. In favor of the weasel it may be said that a pair will clear buildings of rats and mice. It may be tamed when young, and is then docile and gentle. It preys on animals much larger than itself, robs birds' nests, and seems to be fearless. The female's nest is made of straw, moss and leaves for her young, which are usually four or five, crevices or hollow trees being chosen. See ERMINE.

Weatherbee, Sir Richard Linton (1836-), a Canadian jurist, was born at Bedeque, P. E. I., and graduated from Acadia University, Wolfville, N. S. After some years in newspaper work, he studied law and practiced in Halifax, where he became one of the leading authorities in law. In 1877 he became counsel for the Dominion before the Halifax Fisheries Commission. From 1878 to 1905 he was puisne judge of the Supreme Court of Nova Scotia, and later Chief Justice; he retired in 1907.

Weather Bureau, a service for forecasting weather conditions. Such service, more or less satisfactory, is maintained in some degree, at least, by all civilized nations. In 1873 the Federal government organized a service for the benefit of American shipping. The work was entrusted to the signal corps of the army. In 1891 the present United States Weather Bureau was established as a branch of the department of agriculture. The duties of the bureau are set forth in the act of Congress:

> The Chief of the Weather Bureau shall have charge of forecasting the weather; the issue of storm warnings; the display of weather and flood signals for the benefit of agriculture, commerce, and navigation; the gaging and reporting of rivers; the maintenance and operation of sea coast telegraph lines and the collection and transmission of marine intelligence for the benefit of commerce and navigation; the reporting of temperatures and rainfall conditions for the cotton interests; the display of frost, cold wave, and other signals; the distribution of meteorological information in the interest of agriculture and commerce; and the taking of such meteorological observations as may be necessary to establish and record the climatic conditions of the United States, or are essential for the proper execution of the foregoing duties.

The bureau maintains over 200 stations scattered throughout the United States and

Observatory on Mont Blanc.

Observatory on Schneekoppe.

Observatory on the Zug.

METEOROLOGICAL STATIONS.

the West Indies. Each is in charge of one or more trained observers. They are provided with standard barometers, thermometers, wind-vanes, rain and snow gauges, and, in some cases, with sunshine recorders and moisture gauges. Twice a day or oftener they telegraph the Washington office accurate information as to atmospheric conditions. Daily reports are received also from Alaska, Canada, Mexico, Honolulu, United Kingdom, France, Germany, Portugal, Russia, Siberia, Iceland, and the Azores. Each station is a distributing center of information, but forecast centers are maintained in Boston, Washington, New

Temperature Chart.

Orleans, Louisville, Denver, San Francisco, and Portland, Oregon. At eight o'clock each morning every station makes accurate observations, and within 45 minutes these observations are on the wire, going to many destinations. The familiar weather maps are made on the basis of these observations.

In changeable, showery weather, when a rain in one township may be accompanied by a bright day in an adjacent township, a farmer cannot know, indeed, to a certainty, whether to cut his hay or not; but the field is covered so completely that the farmer is able to learn in advance the approach of heavy, prolonged rains, continued dry weather, frosts, and blizzards. The shipper may know whether it is safe to load fruit, eggs, or vegetables in an unprotected car. Market gardeners are warned to protect their gardens. The orange growers of California and Florida have invested heavily in screens and tents, which they use to protect their trees when warned that a cold wave is coming. Railroad superintendents watch for the signal to get their snowplows ready, and steamboat captains venture another trip, or tie up for the winter. Those engaged in cutting ice study the bulletins with care.

Many seaboard storms originate in the

Temperature Chart.

West Indies. If they are headed our way, the news is sent ahead by telegraph. In fact, a storm can hardly reach our coast from any direction without word coming ahead. Storm signals—over 300 in all—fly in every considerable port and harbor of the Atlantic, the Gulf, the Pacific, and the Great Lakes. Sailings are deferred or hastened in accordance with storm forecasts.

More than a million dollars are expended each year for the maintenance of the United States Weather Bureau; but the daily broadcasting of reports makes it possible to save hundreds of lives and many millions of dollars worth of property.

In addition to posting daily bulletins in postoffices and other public places, signals are given by means of flags. There are six well known flags. A square white flag indicates fair weather; a blue flag, rain or snow; a flag half white, half blue, local snow or showers; a white flag with a black square in the center, a cold wave; a red flag with a central black square, high wind and snow. A triangular black flag indicates temperature. Displayed above a blue flag, it indicates rain and warmer; below a blue flag, it means rain and colder.

See CYCLONE; ANEMOMETER; BAROMETER; CLOUDS; RAIN; SUNSHINE; WIND.

Weaver Bird. See NESTS.

Weaving, in general, the art of forming cloth by the interlacing of threads or filaments. Specifically, weaving is confined to those fabrics produced in a loom by two systems of threads. The threads which extend in parallel lines from end to end of the web are called warps. They are placed in the loom before the process of weaving begins. The weft thread extends from side to side of the web and is "thrown in" by means of a shuttle. In the primitive loom, the warp threads are stretched between two "beams" or rollers. The one is called the warp beam, because the warp threads are wound upon it at the beginning of the weaving process. The other is the web beam because it receives the woven web as fast as it is completed. The two heddles, the batten and the shuttle, are the other important parts of the loom. To understand the action of the heddles, it will be helpful to regard the warp threads as divided into two series, the first, third, fifth threads, etc., belonging in Series A, the second, fourth, sixth, etc., in Series B. The heddles are frames from which depend cords, one for each warp thread. Each thread in Series A is attached by an eye or loop to one of the cords of one heddle; each thread in Series B to one of the cords of the other heddle. It will be seen that if the heddle attached to Series A be lifted, every second thread of the warp is raised. This is called "shedding," and allows the shuttle to be thrown between the two series of warp threads. The shuttle carries the weft thread from left to right. Then, as the second heddle is raised, Series B follows; Series A is depressed, the shuttle is thrown from right to left, and a second weft is thus "thrown" into the web.

The batten is a comb-like arrangement, the teeth or strips of which ply between the warp threads. With this the weft thread is "beaten up" that is, crowded close against the preceding weft. The heddles are so arranged as to be raised and lowered by means of a foot treadle. Thus the process of weaving consists of three operations: (1) by means of the treadle the heddles "shed" the two series of warps; (2) the shuttle carries the weft thread between these series; (3) the batten "beats up" the weft to its proper place.

In different countries the hand loom assumed somewhat different forms, but few improvements were effected until the eighteenth century. The first real advance was the invention of a mechanical arrangement for throwing the shuttle. The power looms of the present day are marvels of ingenuity, making possible many variations of the weaving principle and performing the work with wonderful precision and rapidity. The fundamental principle of their action, however, is that of the primitive loom, in accordance with which the weft thread is thrown between the divided or "shedded" series of warp threads, and is "beaten up" into place.

Weber, Karl Maria Friedrich Ernest Von (1786-1826), a famous German composer, was born at Entin, in Holstein. The family into which he was born had been musical for many generations, and Herr Weber inherited, along with his father's bad traits of character, the family genius. His family moved so often, during his early youth, that the future composer received too little general or musical instruction. When twelve years old, however, he received some musical training from a brother of Joseph Haydn. He became thoroughly grounded in piano playing and at the age of twelve, he published six short compositions. Going to Munich when thirteen Herr Weber received more serious training, and there, while still only thirteen he wrote his first opera, *The Power of Love and Wine*. In the year following he wrote the *Wood Nymph*, which was hailed in Germany and elsewhere as a work of

genius. In 1801 he wrote a comic opera, but it failed. Again in 1803 he began to study in earnest, realizing his need of knowledge of musical theory. But in 1804 he secured a position as musical director in a theater at Breslau. So much success turned his head, and he was dismissed. In 1810 he wrote *Abu Hassan,* but the war with France prevented its production. In 1813 he was appointed director of German Opera at Prague, but this position he resigned in 1816, when he was called to Dresden to fill a similar post. More years had brought more earnestness to the young genius. He entered upon his duties at Dresden in 1818 with determination. There, in 1819, he wrote his finest opera, *The Free Shooter.* Herr Weber immediately gained international fame. He had another triumph in 1824 with his *Oberon,* written for the Covent Garden Theater, London. He died of tuberculosis, after a long battle against the disease. His body was buried in London, but was later removed to Dresden.

Webster, Mass., a manufacturing city, is on French River and on the New York, New Haven & Hartford and Boston & Albany railroads, 16 miles southwest of Worcester. The manufacturing interests are extensive, some of the products being shoes, woolen goods and other textiles, machinery, tools, yarn, tobacco products, cutlery and optical goods.

The city has good public schools and a library. The most attractive feature is a natural lake that covers about 1,200 acres. In 1920 the population was 13,258.

Webster-Ashburton Treaty, a treaty concluded at Washington, D. C., between Daniel Webster for the United States and Lord Ashburton for Great Britain, by which the Maine-Canada boundary line was determined. The claims of the two countries had been a source of bitter controversy for a number of years prior to 1841; in the latter year Great Britain sent her representative to the United States, and after months of negotiation the treaty was signed, August 9, 1842. The treaty provided for unrestricted navigation of the St. John's River by the ships of both nations, for mutual extradition of criminals and for co-operation between the two nations in suppressing the African slave trade.

Webster, Arthur Gordon (1863-), American physicist, was born at Brookline, Mass., and educated at Harvard, later studying at Berlin, Paris and Stockholm. In 1895 he received the Thomson prize (Paris) of 5,000 francs for his researches in electrical oscillations. In 1900 he became professor of physics at Clark University; from 1903 to 1904 he was president of the American Physical Society, and in 1915 was appointed to the Naval Consulting Board. He invented several instruments in the field of sound and came to be recognized as a leading authority on this subject in the United States. Among his publications are: *A Mathematical Treatise on the Theory of Electricity and Magnetism; Dynamics of Particles of Rigid, Elastic and Fluid Bodies.*

Webster, Benjamin Nottingham (1797-1882), an English actor-manager and playwright, was born at Bath. He was a member of the Drury Lane company and the Haymarket. His best roles were Triplet in *Masks and Faces,* Penn Holder in *One Touch of Nature,* and Robert Landry in *The Dead Heart.* Among his plays were adaptations of the *Cricket on the Hearth* and the *Bird of Passage.*

Webster, Daniel (1782-1852), a noted American orator and statesman. Born January 18, 1782, at Salisbury, New Hampshire. Died October 24, 1852, at Marshfield, Massachusetts. His father, Ebenezer Webster, was a sturdy frontier farmer, a man of influence and character, who led his neighbors at White Plains, Ticonderoga, Bennington, and West Point. He was the kind of man that plain people put on committees and have confidence in. Daniel was born in a one-story clapboarded house shortly after Cornwallis' surrender. He was the ninth child, not very strong, and much attached to books. His older brothers, now that quiet times had come on, settled to the work of clearing up the farm and let Daniel grow up to be the scholar. Not that he did not ride the horse that plowed the corn and bring the cows home from pasture, but Daniel was the pet, and a new book, bought or borrowed, was always for him. Chores

were never allowed to detain Daniel from attending such sessions of the district school as the meager facilities of that day afforded.

A manufacturer of cotton goods took advantage of current events to print the newly formed Federal Constitution on a gayly colored handkerchief bordered with eagles and flags. Daniel secured one of these at the neighborhood store. "From this," he afterward wrote, "I learned that there was a Constitution and that there were thirteen states."

At the time when Ebenezer Webster was wondering how he could raise money to send his son away to an advanced school, he received an appointment on the bench of the court of common pleas for the county. The position was sort of an assistant and counselor to the judge, a justiceship, it might be called, requiring a knowledge of the people and that degree of hard common sense and integrity of purpose for which he was noted. The office was one of dignity, and afforded the means of sending Daniel to Phillips Exeter Academy and later to Dartmouth College. The story runs that Daniel read Luke's description of the Last Supper and the scene in the garden so understandingly and so expressively that no further examination was decreed requisite for admission to the academy. He outstripped his classmates in ordinary class work, but broke down utterly in declamation. For one who afterward became the orator of the United States Senate this experience may seem strange. "I could not speak before the school. Many a piece did I commit to memory and rehearse in my room over and over again, but when the day came, and the schoolmaster called my name, and I saw all eyes turned upon my seat, I could not raise myself from it. When the occasion was over I went home and wept bitter tears of mortification."

At Dartmouth (1797) Daniel shunned Greek and mathematics, but got on well with Latin and read widely in literature and history. He was not counted a profound scholar, but rather an extraordinarily well informed young man. His shyness wore off and he soon gained reputation as a speaker. When the college town wanted a Fourth of July orator (1800) Webster was invited. Professors of rhetoric have taken an interest in this speech because it was his first public effort. It was very evidently a young man's speech, abounding in high flown expressions such as "Washington, who never felt a wound but when it pierced his country, who never groaned but when fair freedom bled"; Napoleon, "the gasconading pilgrim of Egypt who will never dictate terms to sovereign America"; Great Britain, that "haughty Albion"; Columbia seated "in the forum of the nations," and the "empires of the world are amazed at the bright effulgence of her glory." Our new navy is to "fulminate destruction on Frenchmen till the ocean is crimsoned with blood and gorged with pirates."

A boyish effort, certainly, but not without promise nor unworthy of the patriot who, thirty years later, closed his reply to Hayne in the crowded, breathless Senate chamber with these words, "When my eyes shall be turned to behold for the last time the sun in heaven, may I not see him shining on the broken and dishonored fragments of a once glorious Union; on States dissevered, discordant, belligerent; on a land rent with civil feuds, or drenched, it may be, in fraternal blood. Let their last feeble and lingering glance rather behold the gorgeous ensign of the Republic, now known and honored throughout the earth, still full high advanced, its arms and trophies streaming in their original lustre, not a stripe erased or polluted, nor a single star obscured; bearing for its motto, no such miserable interrogatory as 'What is all this worth?' nor those other words of delusion and folly, 'Liberty first, and Union afterwards'; but everywhere, spread all over in characters of living light, blazing on all its ample folds, as they float over the sea and over the land and in every wind under the whole heavens, that other sentiment, dear to every true American heart,—Liberty *and* Union, now and forever, one and inseparable!"

After graduation Webster read law and taught school to aid his brother Ezekiel through college. Having finished reading law in the Boston office of Christopher Gore, Webster, much to the disappointment of his aged father, declined an appoint-

ment as clerk of court in his home county at $1,500, but he opened an office in Boscawen, so as to be near the old farm. After his father's death, he removed to Portsmouth, the metropolis of the state. Returning to the subject of Webster's style, we may repeat his own testimony, "If anybody should think I was somewhat familiar with the law on some points, and should be curious enough to desire to know how it happened, tell him that Jeremiah Mason compelled me to study it. He was my master. He had a habit of standing quite near the jury,—so near that he might have laid his finger on the foreman's nose,—and then he talked in a plain conversational way, in short sentences, and using no word that was not level to the comprehension of the least educated man. This led me to examine my own style, and I set about reforming it altogether."

A comfortable and lucrative practice now put Webster quite at ease and gave him leisure for politics. He was elected to Congress by the Federalists on an anti-war platform and took his seat May, 1813, as an opponent of President Madison and the party then carrying on the War of 1812 with Great Britain. Webster easily became the leader of the opposition party, but as the country on the whole supported the president's course, Webster's talents appeared to the country at large as rather provincial in their scope. He seemed interested in New England shipping to the neglect of larger issues.

During his absence in Washington a great fire burned up his Portsmouth house and library, inflicting a loss of $6,000, all he had accumulated. Webster decided to move to Boston. What now seems a peculiar wave of public indignation made Webster all the more ready to leave Congress which, of course, is what a change of residence meant. He, with others, voted to change the compensation of members of Congress from $6 per day for the time Congress actually sat, to $1,500 per annum. This now seems a small salary, but there was a loud outcry. Such abominable extravagance and such shameless stealing of the people's money had never been seen in America. Grand juries and legislatures, indignation meetings and newspapers from one end of the country to the other, clamored for the defeat at the polls of all congressmen participating in this atrocious salary-grabbing scheme. Scores of congressmen were not renominated even, and scores were defeated at the next election. Webster felt that genuine corruption such as is attendant upon large expense, especially in war time, went unrebuked and that public opinion in a democracy is intolerant, indiscriminating, and ungrateful.

In 1823, however, Webster reëntered Congress as a representative of the Boston district of Suffolk. During his service as congressman he delivered his first Bunker Hill address in the open air at the laying of the cornerstone of the monument. The veterans of the Revolutionary War were in front of him. School boys are familiar with the lines beginning, "Venerable men, you have come down to us from a former generation." Another *Discourse in Commemoration of the Lives of John Adams and Thomas Jefferson* was delivered in Faneuil Hall, August 2, 1826, the fiftieth anniversary of the date on which the engrossed copy of the Declaration was laid upon the table of Congress for signature. The most brilliant portion of this oration is the supposed speech of John Adams beginning, "Sink or swim, live or die, survive or perish, I give my hand and my heart to this vote."

This speech was supposed by many to be a quotation and to have been delivered by John Adams, but Webster wrote that he had no guide in writing it beyond the known character of Adams and a suggestion from his widow, adding, "I will tell you what is not generally known. I wrote that speech one morning before breakfast in my library, and when it was finished my paper was wet with tears."

In 1827 Webster took his seat in the Senate. Here his real fame was won. He had not been a national character in the House, or at least had not thrown himself into legislation heartily, but in the Senate with the raising of large issues Webster rose to a commanding position. His famous encounter with Hayne has been referred to. Webster became the spokesman of the principle that states are subordinate to the nation, that the national government derives its authority, not from the states but from

the people—a question settled only by the Civil War. As a New England man, he supported a manufacturer's tariff, and as a maintainer of national authority, he opposed the doctrine of states' rights and supported President Jackson in his famous controversy with Calhoun and South Carolina. Calhoun, Clay, and Webster were the strong men of the Senate. Calhoun won Clay to his support. As the history of this period is too extended for review, it may be stated in a word that Webster's great speech for the Union is that known as *The Constitution Not a Compact Between the States.*

From this time on, Webster was recognized as a national leader of the Whig Party. He became an avowed candidate for the presidency, but was passed by repeatedly for other candidates. In 1840 the Massachusetts Whigs put Webster forward for nomination, but the convention took Harrison. As McMaster puts it, "Though nobody wanted him to be president, the whole country wanted to hear him speak," and Webster entered heartily into the log-cabin, hard-cider campaign that ensued. It is estimated that no less than 75,000 persons were in attendance at the largest meeting held.

Following Harrison's election, Webster left the Senate for a seat as secretary of state in the new cabinet, but Harrison's death, the completion of negotiations to establish the boundary between Maine and Canada, the unpopularity of John Tyler, now president, and a desire to be free to seek the nomination for the presidency induced Webster to resign and return (1842) to his home.

In 1844 Webster was passed over and Henry Clay was nominated but defeated at the polls, and Webster was returned by Massachusetts to his old seat in the Senate. With Clay out of the way it now seemed possible and probable that Webster might be the next candidate of the Whig party, but Taylor, returning with military laurels from the Mexican war, was nominated and elected, while Webster retained his seat in the Senate. The real issue of the Mexican War was the disposition to be made of acquired territory—whether this new territory should be slave or free. Webster made his famous *Seventh of March Speech* supporting the compromise movement of 1850. Southern men and business men with commercial interests in the South, all conservative men, were loud in their praise. Two hundred thousand copies of his speech were called for, but the anti-slavery men, the Free-Soilers, and the Northern Whigs set upon Webster in full cry. Sumner declared him an apostate; Horace Mann called him a "fallen star"; Theodore Parker said he had not a hundred adherents worth counting in all New England. Whittier wrote his *Ichabod,* beginning,

> So fallen! so lost! the light withdrawn
> Which once he wore!
> The glory from his gray hairs gone
> Forevermore!

Without doubt, Webster failed to realize that the controversy relative to slavery had reached so acute a stage. Desirous of the presidency, he refused to believe that the South could no longer support a Northern man, and that his old neighbors would no longer support a man who tried to hold Southern adherents. Webster again left the Senate for a place in Fillmore's cabinet, but all hope of recognition by a national convention faded out when the Whigs of 1852 placed Gen. Winfield Scott in nomination. October 24th of that year Webster died at Marshfield, a bitterly disappointed, unhappy man. By all odds the best account of Webster's life is that by John Bach McMaster.

Webster went wrong on some public questions:

> What do we want with the vast worthless area, this region of savages and wild beasts, of deserts, of shifting sands and whirlwinds of dust, of cactus and prairie dogs? To what use could we ever hope to put these great deserts, or these endless mountain ranges, impenetrable, and covered to their base with eternal snows? What can we ever hope to do with the western coast, a coast of three thousand miles, rock-bound, cheerless and uninviting, and not a harbor on it? What use have we for such a country? Mr. President, I will never vote one cent from the public treasury to place the Pacific coast one inch nearer to Boston than it is now.—Webster, *Speech on the Union Pacific.*

See HARTFORD CONVENTION; CLAY; CALHOUN; HAYNE.

Webster, Henry Kitchell (1875—), an American novelist, born at Evanston,

Ill., and educated at Hamilton College. He was instructor in rhetoric in Union College, Schenectady, N. Y., in 1897 and 1898. Following this he began the publication of stories which became very popular and raised Webster to a prominent position among American writers of fiction. In collaboration with Samuel Mervin he wrote *The Shore Line War, Comrade John,* and *Calumet K.* Some of the best known novels of which he is the sole author are *Roger Drake, The Sky Man, The Ghost Girl, The Story of a Corner in Land, The Butterfly* and *The Thoroughbred.*

Webster, Noah (1758-1843), a noted American lexicographer. A native of Connecticut and a graduate of Yale College, class of 1778. He became a teacher in Hartford and studied law, but was led by the distressed condition of business to defer entering the profession. He began writing by preparing schoolbooks. He had a patriotic notion, quite prevalent at the close of the Revolutionary War, that America should cease to import textbooks from England. He prepared a *Grammatical Institute of the English Language,* to consist of three parts, a spelling book, a grammar, and a reader. These books became popular. A royalty of a trifle less than a cent a copy on the speller allowed him by the publishers soon supported his family. Many million copies of Webster's spelling book have been sold. The revised speller is selling yet. To the widespread use of this speller we owe in large part the uniformity of pronunciation which prevails in this country.

In 1789 Webster opened a law office in Hartford but four years later he went to New York. In 1798, he removed to New Haven and in 1807 began the compilation of the *American Dictionary of the English Language.* The first edition in a single volume appeared in 1828. It contained 2,000 words and 30,000 to 40,000 definitions and meanings not found in any other dictionary of the time. Three years later the second edition in two volumes appeared. During the preparation of his dictionary, Webster visited Paris, Oxford, London and Cambridge to consult scholars and make use of libraries. The chief editions are the *Unabridged* and *International.*

Wedge, wĕj, a well known device consisting of a piece of wood, metal, or other hard substance, thick at one end and sloping to a thin edge at the other. The wedge is used for splitting timber, quarrying rock, and for raising great weights or exerting intense pressure. A quick tap on the head of a wedge produces more effect than a heavier, sluggish blow. It is supposed that the tap sets up a tremor or vibration in the inclosing edges of the resisting substance, and that the wedge advances before the vibrating material can return. Something of the sort may be noticed in driving a nail. Lively taps force a nail into hard timber when heavy blows fail. Other conditions being equal, the thinner the wedge the greater its power. The sharp edge of cutting tools is an application of the principle of the wedge. The uselessness of a wedge until it has effected an entrance, and its power afterward, have given rise to several popular expressions, as "the entering wedge," "wedging his way in," etc.

Wedgewood, Josiah (1730-1795), a celebrated English potter. He was the son of a Staffordshire potter and learned his father's business. An incurable lameness forced him to give up standing at the potter's wheel. He turned his attention to decorating. He discovered a method of mixing and baking that resulted in the production of a stoneware so fine in texture and so hard that exquisite works of art could be reproduced on its surface. He made not only white and semi-transparent stoneware, but queen's-ware in cream colors; basalt ware of Egyptian black, suitable for plaques, seals, busts, and medallions; red ware, and mottled ware. One of his specialties was a jasper ware resembling white terra cotta. Cobalt blue, lilac, greens, and yellows were favorite colors. Wedgewood ware was famous for its decorations, both raised and depressed, that is, cameos and intaglios. One of his Portland vases was valued at $250, and was a present fit for a duchess. When wealth and fame came to Wedgewood, he founded the village of Etruria for his workmen and aimed to educate their children to thrift and in design-

ing, decorating, and other principles of the potter's art. See POTTERY.

Wednesday, wĕnz′dā, the fourth day of the week. The name is Scandinavian, meaning Odin's or Woden's day. The Swedish name is Odensdag. The Germans call the day Mittwoch or midweek, a very appropriate name. In the Church of England, the American Episcopal, and the Roman Catholic churches, Ash-Wednesday is the first day of Lent.

Weeds, plants found troublesome in tillage. Some one has defined weeds as plants out of place. Some farmers insist that weeds be exterminated on their farms. They cut fence-row weeds and sow grass in their place, take pains that no weeds go to seed, and clean all their seed with care before planting. It is difficult to free a farm from weeds, and difficult to prevent seeds from blowing over from the premises of an untidy neighbor. Then, too, some weeds spring up and mature seed between the time of the last cultivating and the harvesting of the crop. In irrigated regions where every drop of moisture is precious, there is a particular reason for keeping the soil free from weeds. It is said that a crop of weeds draws three hundred times its own weight of moisture out of the ground and allows it to evaporate through its leaves. The irrigating farmer aims to secure clean tillage. We may name over a hundred common weeds but scarce a dozen are troublesome. If all the fertility now going to raise weeds were expended in producing useful crops, the world's productiveness would no doubt be doubled.

Week, a period of seven days. Although it is one of the commonest divisions of time, it is of unknown origin. The Greeks and Romans divided the month into three periods each. Although the people of India have names for the successive days, the week is said to be unknown. The week was introduced into modern Europe by the Christians, who, in turn, derived it from the Hebrews. The week is not an exact division of either the month or the year. It appears to be based rather on the Hebrew account of the origin of the world, according to which the Creator worked six days and rested the seventh. See SUNDAY; MONDAY, etc.

Weevil, or **Curculio,** a comprehensive name for numerous beetles with their grubs destructive of fruit and grain. Some weevils roll up the leaves of trees, depositing eggs in the roll, but the curculios or weevils dreaded by the fruit grower are beetles with long snouts, even twice the length of the body, with which they first puncture young fruit. Then, after depositing an egg in the hole, the snout is used again to push the egg to the bottom of the orifice. As the fruit grows, the egg hatches out into a grub and the grub grows with the fruit. Some kinds are content to cut a path out through the young fruit and drop to the ground. Here they form pockets and remain until they are ready to come up as beetles. The stung fruit may mature and usually does so, but it is gnarly. Other grubs cause the fruit to fall. They leave it for the ground or remain within for a time and come out beetles. The adage, "every rose has its thorn," may be changed to "every fruit has its weevil." Acorns, chestnuts, hazelnuts, rosehips, apples, pears, plums, apricots, cherries, strawberries, grapes, rice, sugarcane, corn, peas, pine cones, cotton bolls, bread, biscuit,—each has its peculiar weevil, a condition expressed by the popular term of "wormy." The article on SPRAYING gives some idea of the pains taken by fruitgrowers to spread poison for adult weevils, and to poison the hearts of the blossoms for the destruction of the grubs as they hatch. Another plan is that of catching the adult beetles at the season when they infest fruit trees to lay eggs. They may be shaken off on a large canvas and burned. The canvas may be stretched on a frame with a slit at one side for the admission of the trunk of the tree. The frame is carried on a sort of wheelbarrow readily wheeled from tree to tree. See COTTON BOLL-WEEVIL.

Weight, wāt, the downward force, heaviness, or gravity of a body. It is due to the attraction between the earth and bodies on its surface. A stone pulls the earth toward it just as hard as the earth pulls the stone, but, if dropped from the hand, a stone will go to the earth, because the earth has so much more matter. Weight should be distinguished carefully from mass. A cannon ball contains the same amount of ma-

terial, that is to say, has the same mass wherever it may be; but it weighs most at the surface of the earth, or more strictly speaking, at the sea level, and loses weight perceptibly at high altitudes, and very rapidly indeed beneath the earth's surface. Half way to the earth's center it would only weigh about one-half as much. At the center of the earth, it would have no weight at all, yet the mass would remain the same. For measures of weight, see AVOIRDUPOIS; TROY WEIGHT; METRIC SYSTEM; POUND; TON.

Weight of the Human Body. As is well known, people differ in weight. Midgets are not uncommon. When Tom Thumb first called on Barnum, the showman, he weighed but fifteen pounds. Lambert of London, who was five feet eleven inches in height, weighed 704 pounds. Infants vary in weight quite as much as adults. A weight at birth of from six to ten pounds may be considered normal; boys as a rule weigh about a pound more than girls. Insurance experts have built up tables of averages based on the weight and height of many actual weighings and measurements. The standard table for men is that of Dr. George R. Shepherd, compiled in 1897. As people are weighed with their clothing and standing in their shoes, the actual weight may be found by subtracting about one eighteenth from the weights given in the table. To find the actual height, an inch and a quarter should be subtracted from the given height. The following is condensed from Dr. Shepherd's

TABLE OF THE HEIGHTS AND WEIGHTS OF MEN.

Age.	20	30	40	50	60
5 ft. 0 in.	120	128	133	134	131
5 ft. 1 in.	122	129	134	136	134
5 ft. 2 in.	124	131	136	138	137
5 ft. 3 in.	127	134	139	141	140
5 ft. 4 in.	131	138	143	145	144
5 ft. 5 in.	134	141	146	149	148
5 ft. 6 in.	138	145	150	153	153
5 ft. 7 in.	142	150	155	158	158
5 ft. 8 in.	146	154	160	163	163
5 ft. 9 in.	150	159	165	167	168
5 ft. 10 in.	154	164	170	172	174
5 ft. 11 in.	159	169	175	177	180
6 ft. 0 in.	165	175	180	182	185
6 ft. 1 in.	170	181	186	188	189
6 ft. 2 in.	176	188	194	194	192
6 ft. 3 in.	181	195	203	201	

A second table was prepared by Dr. F. S. Weisse for women. Dr. Shepard is of the opinion that exact figures may be had by subtracting one-eighteenth from the weight for clothing and by deducting an inch and one-half from the height, on account of high-heeled shoes. The following, then, is a condensed

TABLE OF THE HEIGHTS AND WEIGHTS OF WOMEN.

Age.	20	30	40	50	60
4 ft. 11 in.	113	117	122	128	126
5 ft. 0 in.	114	119	125	130	129
5 ft. 1 in.	116	121	128	133	132
5 ft. 2 in.	118	123	132	137	136
5 ft. 3 in.	122	127	135	141	140
5 ft. 4 in.	125	130	138	145	144
5 ft. 5 in.	128	135	143	149	148
5 ft. 6 in.	132	139	146	153	152
5 ft. 7 in.	135	143	150	157	155
5 ft. 8 in.	140	147	155	161	160
5 ft. 9 in.	144	151	159	166	165
5 ft. 10 in.	147	155	163	170	169
Avera'e weight	126	132	139	145	142

Some interesting deductions may be drawn from the tables. A young man weighs about seven pounds more than a woman of the same height and age. Short men grow stout faster than tall men. Fifty years is about the age of greatest weight for both men and women. After the age of twenty-five women increase in weight faster than men. In calculating risks, life insurance medical directors regard a weight of five per cent below normal as the best risk for persons about thirty years of age, but for ages below thirty a weight five or ten per cent above standard is considered an indication of sound health. A weight of twenty per cent above standard is considered stout. Overweight does not add to strength. It is considered a more serious menace to health and longevity than is underweight. Physicians claim that one should keep his weight within ten per cent of the standard.

Many interesting facts relating to weight may be stated. The average child doubles in weight during the first twenty-two weeks of life. This rate of increase is not kept up. If it were a child would weigh several tons before the age of school arrived. So far as the makeup of the body is concerned a weight of 150 pounds is distributed about as follows: muscles and their appendages, eighty-one pounds; bones, twenty-two pounds; fat, eighteen pounds; skin, seven pounds; brain, three pounds; internal organs, twelve pounds; blood, seven pounds.

As the body is about seven-eighths water it follows that the parts of the body named contain about 137 pounds of water by weight, or not far from seventeen gallons. Directors of athletics state that it is not unusual for an oarsman to lose eight pounds of weight in the twenty minutes required to row the annual race at Poughkeepsie over a four-mile course.

Weihaiwei, a district on the northeast coast of China directly south of Port Arthur. It has an area of about 285,000 square miles and 150,000 inhabitants. In 1898 China leased this district to Great Britain for so long a period as Russia shall remain in possession of Port Arthur. The territory includes an excellent harbor and the walled town Weihaiwei. Great Britain has the right to erect fortifications and to defend the territory. Otherwise Chinese administration is not to be interfered with. This station was acquired for the purpose of watching the Russians in Port Arthur. At the close of the Russo-Japanese war the Russians were forced to retire from Port Arthur, but nothing has been heard of returning Weihaiwei to China. It is about 1,200 miles distant from Hong Kong, the British center of Chinese trade. A considerable trade is carried on. See HONG KONG.

Weimar, vi'mar, a city of Germany. It is the capital of the former grand duchy of Saxe-Weimar. It is pleasantly situated on the Ilm in the district known to tourists as Thuringia. Its neighbors are Gotha, Jena, Erfurt, and Eisenach. Weimar is a city of about 37,900 inhabitants. It is noted as the former residence of Duke Charles Augustus, a liberal patron of literature. Goethe resided here fifty-six years. Schiller also made Weimar his home. Other noted names are Herder and Wieland. The homes occupied by these distinguished men are still shown. The public squares are adorned with monuments to their memory. On account of its literary associations Weimar has been termed the German Athens. One of the most remarkable buildings is the State Church which possesses an altarpiece by Lucas Cranach, in which he introduced portraits of himself, Luther, and Melanchthon.

See GOETHE; SCHILLER.

Welland, Ontario, the county town of Welland County, is on the Welland River and the Welland Ship Canal, eight miles from Lake Erie, 14 miles from Niagara Falls and 22 miles from Buffalo. It is served by the Michigan Central, Grand Trunk, Canadian National, Wabash, Pere Marquette and Toronto, Hamilton & Buffalo railroads. Hydro-electric power is available for manufacture; Welland's factories produce electro metals, cordage, including binder twine and rope, pipe, boilers, milk products, flour, steel and ferro-alloy castings, lumber, carbide, chemicals, cotton goods, clothing and other articles.

Welland has primary, public and high schools, a business college, hospital, public library, industrial home, registry office and other county buildings, and an agricultural park, recreation parks and other attractions. The water system is the property of the city. All the leading religious denominations have substantial church buildings; and the aqueduct, a rare engineering feat, carries the water of the ship canal over that of the Welland River. Welland was incorporated as a city July 1, 1917, on the semi-centennial of confederation. In 1921 the population was 8,654.

Welland Canal, an artificial waterway constructed on Canadian soil from Port Colborne on Lake Erie to Port Dalhousie on Lake Ontario. It enables ships to pass by the Falls of Niagara. It is twenty-seven miles long and maintains a channel fourteen feet deep. Ships ascend or descend 363 feet by means of twenty-six locks. The canal was opened in 1833. It has been enlarged twice at a total cost of $25,000,000. A third enlargement will increase the width to 200 feet and the depth to 25 feet, and will reduce the number of locks from twenty-five to seven. The customary cargo is wheat or iron ore. The canal is operated by the Canadian government, but it is open for commercial purposes to the ships of all nations. See CANAL; SUEZ; SAULT STE. MARIE.

Wellesley College, an undenominational institution of higher learning for women, located at Wellesley, Mass. It was founded by Henry Fowle Durant, a wealthy lawyer, whose contributions amounted to over a million dollars. It was opened to students

in 1875. Entrance is by examination. The courses are to a large extent elective, and the degrees of B. A. and M. A. are conferred.

Wellesley is a contributor to the American Academy in Rome, the American School for Classical Studies in Athens, the American School for Oriental Research in Jerusalem, the Association to Aid Scientific Research by Women and to the Marine Biological Laboratory at Wood's Hole, Mass. The main building was destroyed by fire in 1914. There are 141 in the teaching faculty and about 1,600 students. The library contains over 100,000 volumes, and includes, besides the collection of the founder, the Plimpton collection of Italian literature, a very large Ruskin collection and complete collections of the first editions of Browning, Tennyson and other English poets.

Wellington (1769-1852), a famous English soldier and statesman. His full name was Arthur Wellesley, Duke of Wellington. He was the son of an earl. Originally the family name was Wesley. He was born near Dublin. He was educated at Eton in sight of Windsor Castle and in a military academy. He had little love for study. In 1787 he entered the British army as an ensign. He rose rapidly and saw service at the head of his regiment in Bengal. He proved so efficient that he was promoted repeatedly and rose to be a major general. On the restoration of quiet in India he was welcomed home in 1805 with a vote of thanks by both houses of Parliament. Before going to India he had sat in the House of Commons. On his return he was made secretary for Ireland, but the Napoleonic wars demanded the exercise of his undoubted military talent. In 1807 he accompanied Nelson to Danish waters in command of the land forces. The next year he was made lieutenant general and sent with an English army to the Spanish peninsula to oppose the French occupation. Here he carried on a series of remarkable campaigns. He managed to gain an ascendency over the jealous and suspicious Spanish and Portuguese commanders and juntos; he fed his army without taking the property of the natives save by paying for it; and, though inadequately supported from home by supplies and reinforcements, he out-marched, out-fought and out-generaled such famous French marshals as Ney, Soult and Massena. He fairly drove the French out of Portugal into Spain, and out of Spain into France. He had already taken the French city of Toulouse when the news arrived of Napoleon's abdication. He was a member of the congress sitting at Vienna when Napoleon escaped from Elba. He was made commander-in-chief of the forces raised to oppose Napoleon, and won the battle of Waterloo. In gratitude Parliament made him Duke of Wellington and granted him an estate and a pension, together valued at over $3,000,000.

At the conclusion of peace Wellington returned to politics. His wealth and social position made him irresistible. He rose to be prime minister and again held the position of foreign minister under Robert Peel. His political career was not successful. He opposed reforms or yielded to them only when forced to do so. On one occasion he was actually assaulted by a London mob and his life was in danger. He was a soldier, not a statesman, one of the world's great commanders, a man who rendered eminent military service, but he was not a sympathetic friend of the people.

At his death his great victories were recalled. His favorite horse was led in the funeral procession with empty boots in the stirrups. His remains were laid at rest in St. Paul's amid universal regret. Alfred Tennyson, poet laureate, wrote a magnificent *Ode on the Death of Wellington:*

Bury the Great Duke
With an empire's lamentation,
Let us bury the Great Duke
To the noise of the mourning of a mighty nation.

See WATERLOO.

Wells, Herbert George (1860-), an English author known for his force and brilliancy of his writings. He was born in Bronley, Kent, of middle-class parents and educated at London University. After teaching a number of years, he began writing for magazines, and in 1895, produced the *Time Machine,* an imaginative story which met with immediate suc-

cess. This was followed by *The War of Worlds, When the Sleeper Wakes, The Food of the Gods,* and *In the Days of the Comet.* His later novels deal with everyday life and some of them set forth the author's belief in socialism. Those best known are the *Research Magnificent,* the *Passionate Friends, T'ono Bungay,* and *History of Mr. Polly.* His *Mr. Britling Sees It Through* is one of the best stories founded on the Great War.

Wends, a Slavic people related to the Poles and the Bohemians. Though few in number they have maintained their identity while living in the midst of the German people, occupying a territory of about 1,200 square miles in the upper valley of the Spree. They still preserve their customs, language and literature.

Wergeland, vär'gē-lån, **Henrik Arnold** (1808-1845), a Norwegian poet. He was born in Christiansand and, after studying at Christiania, became custodian of the university library. He maintained violent opposition to everything that was Danish and led the Ultra-Norwegian party in their attacks. Some of his poems are, *Jan van Huysum's Flower-Piece, The Jew, The Jewess,* and *The English Pilot.* His complete works were published in 1852-57.

Wesley, an English family of talented clergymen and poets. The father, Samuel Wesley, and his three sons, Samuel, John, and Charles, merit notice.

Samuel Wesley, the father, was a graduate of Exeter College, Oxford. He was for many years rector of the parish of Epworth in Lincolnshire. He wrote a number of religious works, including a *Life of Christ,* and one or two popular hymns, including *Behold the Saviour of Mankind.* He had three sons, all of whom were educated at Christ Church, Oxford.

Samuel Wesley, the oldest son, lived 1691-1739. He took orders in the Church of England and adhered to that denomination through life. He was head master of a grammar school at Tiverton. He wrote a number of well known hymns.

John Wesley, the second son, the founder of Methodism, was born at Epworth June 28, 1703. He died in London March 2, 1791. He was graduated in 1724, and was appointed a fellow in Lincoln College, Oxford. In 1729 he acted as his father's curate at Epworth. On returning to Oxford to a lecture, he became a member of a coterie of young men of a serious turn of mind who met Sunday evenings to study the Scriptures. The members were nicknamed Bible Moths. The little society fasted twice a week and took communion frequently. They interested themselves in charities, visiting the prisons and the sick. Charles Wesley, Harvey, and Whitefield were members of this society. In 1735, at the invitation of General Oglethorpe, John, with his brother Charles, went to preach to the colonists of Georgia. Here he remained three years. He became intimately acquainted with a Miss Hopkey, a niece of the Governor of Savannah. He expected to marry her, but did not do so. On her marriage to a Mr. Williamson, he refused to admit her to the Lord's Table. This created a disturbance, on which Wesley "shook the dust from his feet" and returned to England. He became associated with Whitefield in the management of open air meetings. In London he established himself in an old building, known as the foundry, formerly used by the government in casting brass cannon. This structure was his headquarters for some time. Although Wesley never formally left the Church of England, being a strong believer in Episcopacy, he founded an association known as the United Society for Week Day Meetings. His efforts were directed toward a revival of piety within the Church of England, but the organization of the society mentioned is regarded usually as the beginning of Methodism. He was a man of great energy. He was capable of riding fifty miles a day and of addressing several outdoor meetings. He wrote a number of miscellaneous books, including a grammar, a *Dictionary of the English Grammar,* several biographies and lectures on logic and medicine, as well as several manuals of history. The copyright brought him in a comfortable living and rendered him independent of church livings and collections.

Charles Wesley, the third son, was born at Epworth. He lived 1708-1788. He was a member of the coterie mentioned above at Oxford. He says of himself that

he began "to observe the method of study prescribed by the university. This gained me the harmless nickname of methodist," a name subsequently transferred to the little society of which he was a leading member. He accompanied his brother John to Georgia, but he was not successful in that colony. He returned to England and became an active itinerant preacher aiming to do good among the lowly. He wrote, it is said, over 6,000 hymns, some 500 of which still find place in the Methodist hymnals.

See METHODIST; EPWORTH LEAGUE.

West, one of the cardinal points of the compass. The name appears to be related to a group of words denoting an abode or house. West, therefore, seems to have reference to the home of the sun at night. In architecture, the west front of a cathedral is the main portal, situated at the foot of the cross farthest removed from the choir. In American history the West has receded rapidly toward the Pacific. The term was applied to the Ohio Valley, then to the states in the Mississippi Valley, and now it refers more particularly to the section west of the Mississippi, or even to the Pacific States. The word is entirely relative, England is in the west with reference to central Europe.

West, Benjamin (1738-1820), a noted American painter. He was a Quaker boy of Pennsylvania. He was instructed by a Philadephia artist and set up a studio for himself in that city. He went to London in 1763. He visited the famous galleries of Rome, Florence, and Venice. George III gave him orders for a number of pictures and in 1772 employed him as historical painter to the king. In 1790 West was appointed surveyor of the royal gallery. West's most celebrated painting is the *Death of General Wolfe.* In this great scene he had the courage to depart from long established custom. He dressed his figures in their usual clothing, instead of draping them with classical robes as had been the rule for centuries. The picture made a great hit. An engraving by a celebrated artist by the name of Woollett had a large sale also, the greatest hitherto known. West painted a series of historical pictures for Windsor Castle and a second series of religious subjects for King George's Chapel there. He took a prominent part in the organization of the Royal Academy. He and Sir Joshua Reynolds were fast friends. On the death of Reynolds in 1792 West was made president. West's remains were placed in St. Paul's.

Western Australia, the largest state of the Commonwealth, is bounded on the north by the Indian Ocean; on the east by the Northern Territory and Southern Australia; and on the south and west by the Indian Ocean. The area is 975,920 square miles, but only 332,213 people inhabited this vast territory in 1921. Boulder, the largest town, had a population of 8,218 in 1921.

SURFACE AND DRAINAGE. Western Australia has about 5,200 miles of coast line; along the southwestern coast are the Darling Mountains, a range having a maximum elevation of 1,500 feet. Farther inland is the Stirling Range, in which is Bluff Knolls, 3,640 feet, the greatest elevation in the state. Three hundred miles of the southern coast consist of steep limestone cliffs, the limestone formation extending inland as an elevated plateau. The interior of the state consists of wide, undulating plateaus crossed by low, isolated ridges. In the north the plains terminate in bold, canyon-indented escarpments. The western coast is low and only slightly indented.

There are several lakes in the interior south of the central east and west line, but these become salt incrusted mud flats in seasons of drought. The principal river of the north is the Fitzroy. Farther toward the south the Ashburton, Fortesque, Gascoyne and Murchison drain the state. All of these streams flow westward, and most of them rise to the west of the center line north and south.

In the southwest and northeast the annual rainfall varies from 30 to 40 inches, the interior region receiving less than 10 inches a year. Eucalyptus and other trees cover a large section in the southwest; during the rainy season the southeastern section affords rich pasturage; but the interior is in general a semi-arid waste of stone, sand and scrub vegetation. The climate of the state is pleasant and healthful.

INDUSTRY. Agriculture, lumbering and mining are the leading industries. Wheat

is the leading agricultural product, most of the 1,605,000 cultivated acres recorded in 1920 being given to this cereal. Oats, potatoes, hay and fruit are also grown in considerable quantities. Numerically and commercially, sheep are the most important domestic animals; 39,524,000 pounds of wool were clipped in 1920-21. Horses, cattle, camels, goats, swine and mules are also raised.

Gold is the principal mineral, the 1920 yield being 617,842 fine ounces. Though this is a substantial reduction since 1910, Western Australia is still the first producer in the Commonwealth. Coal mines yielded 462,021 tons in 1920; 130,692 fine ounces of silver were mined, and copper, tin, lead and pyrites are also found in workable quantities.

Education. Education is free and compulsory. In 1920 the state had 695 public and 128 private schools. Students attend kindergarten and university at government expense.

Government and History. The governor of the state holds office under crown appointment, and is assisted in governing by a parliament divided into two houses. Equal suffrage is enjoyed. Perth is the capital.

The first settlement was made in Western Australia by a colony of English in 1825. In 1829 the government made extensive land grants for the purpose of stimulating colonization, but growth was very slow until after 1870. Western Australia was admitted as a state of the Commonwealth on January 1, 1921. The resources of the state will not be fully developed until the population increases; the government continues to aid immigration, but the population increases slowly.

Western Reserve, a portion of the Northwest Territory reserved by the State of Connecticut. It is known also as Connecticut Reserve. Connecticut ceded all claim to western sovereignty to the general government, but retained property ownership in a tract in northeastern Ohio. The reserve extended along the southern shore of Lake Erie for 100 miles westward from the Pennsylvania line, and ran from the 41st parallel of latitude northward to the lake. In 1795-6 Connecticut sold these lands, save 500,000 acres, to the Connecticut Land Company which promoted settlements. An industrious population flowed in, chiefly from New England. Thirteen counties were formed in whole or in part from the territory of the Reserve. Cleveland is the largest city. The designation, "Western Reserve," has been perpetuated by the university of that name located at Cleveland. The money received from the sale of lands was invested by Connecticut in a school fund. The interest is used in maintaining public instruction.

Westfield, Mass., a manufacturing city, is on the Westfield and Little rivers and on the New York, New Haven & Hartford and Boston & Albany railroads, nine miles west of Springfield. It has a very pleasant location in the Berkshire Hills, and is in every sense an attractive city. The principal manufactories are engaged in making whips, cigars, bicycles and motorcycles, and other products are bricks, thread, heating apparatus, paper and foundry and machine shop products.

Attractive features are Woronoco Park, Westfield Athenaeum, a state normal school, a large high school, a public library and a Federal building. In 1920 the population was 18,604.

West Hoboken, N. J., important for its manufacturing interests, is on the Hudson River adjoining Hoboken and Jersey City. Silk, silk goods and embroidery are the leading manufactures, though willow furniture, artificial flowers, gloves, braid, feathers, rock candy, cloaks and suits, chemicals and pipes are also made. Iron, lithographic and engraving works are likewise located in the city.

Prominent features of the city are a large park, St. Joseph's Auditorium, Monastery church, Emerson High School and Carnegie library. The inhabitants numbered 40,074 in 1920.

West Indies, west in'dez, an archipelago between North and South America. The islands extend in a long curve from a point midway between Yucatan and Florida to a point near the South American mainland. They inclose the Caribbean Sea, separating it from the Gulf of Mexico and from the

Atlantic. When first reached by Columbus they were supposed to be outlying islands of southeastern Asia. As they were reached by sailing westward they were called the West Indies and their inhabitants were called Indians. The climate is tropical. The chief products are sugar, tobacco, and coffee. From June to October the entire region is subject to sweeping hurricanes. See articles on CUBA; HAITI; PORTO RICO; JAMAICA; BAHAMAS; CARIBBEAN.

Westinghouse, George. See AIR-BRAKE.

Westminster, a district of London. It was formerly an independent city lying just above London on the left bank of the Thames. It was noted for its abbey, around which the ancient town of Westminster grew up. Westminster was a famous meeting place for church dignitaries. It was the favorite residence of William Rufus and other English monarchs. The suburb has long since become a part of the city. Westminster Hall has been supplanted by the House of Parliament. See PARLIAMENT

Westminster Abbey, the most noted church in Great Britain. It stands on low ground on the left bank of the Thames in the district of Westminster. It is believed that an Anglo-Saxon church occupied the site as early as 616. It was destroyed by the Danes but was reërected in 985. A large abbey or house for monks was built here in 1049-65. The present building is really a church, not an abbey. It was begun in the latter half of the thirteenth century. It has been altered and enlarged repeatedly. The chapel of Henry VII was erected by that king in the sixteenth century. The towers were built by Sir Christopher Wren in 1714.

The church has the form of a Latin cross. It is 513 feet in length. The body of the church is 102 feet high. The towers are 225 feet high. The transept is 200 feet in length and 80 feet wide. There is a magnificent organ, rebuilt in 1848. There are over twenty stained glass windows and a number of pieces of fine old tapestry, as well as Venetian glass mosaics. The interior is finished chiefly in rich marble.

Beyond the transept, in a semicircle about the choir, there is a series of eight chapels. The most interesting of these is that of Henry VII, forming the extreme eastern part of the abbey. This chapel is a beautiful structure without and within. Brass-covered gates are decorated with roses in allusion to the union of the houses of York and Lancaster in the marriage of Henry VII and Elizabeth. The chapel is in itself larger than many a cathedral. It contains over 1,000 statues and figures. Carved choir stalls of dark oak line either wall. Each stall is assigned to a knight of the order of Bath. Each seat is marked with armorial bearings in brass. The sword and banner of the occupant are suspended above the seat. The distinguishing glory of this chapel is a suspended ceiling of fan tracery which droops downward like a festoon of lace. The airiness and richness of this exquisite work are well expressed by Washington Irving: "Stone seems by the cunning labor of the chisel to have been robbed of its weight and density, suspended aloft, as if by magic, and the fretted roof achieved with the wonderful minuteness and airy security of a cobweb."

Services are held not infrequently in the abbey, but it is celebrated chiefly for its royal burial vaults and monuments innumerable to celebrated men. It is regarded by Englishmen "as their national Walhalla or Temple of Fame." Despite the fact that even children and many persons now long forgotten have been interred here, burial beneath the floor of Westminster is considered the greatest honor that can be shown. There are many memorials on the walls and statues of prominence. Many an illustrious name appears on a plate let into the flagging of the floor. The presence of a memorial is not, however, a certain indication of burial here. Among the names best known to American readers are: William Pitt, Lord Chatham; Canning and Palmerston, noted statesmen; Lord Mansfield, the statesman judge; Robert Peel, the parliamentary reformer; Sir Eyre Coote, commander of the British forces in India; Warren Hastings, the subject of Macaulay's famous essay; Cobden, the free trader; Wilberforce, the emancipator of slaves; Sir Isaac Newton, the student of physics; Charles Darwin, the eminent naturalist; Charles Lyell, the geologist; Fox and the younger Pitt, side by side; and

Rowland Hill, the advocate of cheap postage. The sarcophagus of Major André may be seen in the south aisle. David Livingstone, the African explorer, and Robert Stephenson, the engineer, lie in the nave. There are lords, earls, dukes, and ladies without number.

The chapel of Henry VII is particularly the burial ground of royalty. Lady Margaret Douglas, Mary, Queen of Scots, Charles II, William and Mary, Queen Anne, Henry VII and his wife, Queen Elizabeth, James I, and George II all rest here.

Interesting and even bewildering as the monuments of royalty are, interest centers in the portion of the south transept known as the Poets' Corner. Of all the spots under the protection of the English flag or held by English-speaking people, this is indeed holy ground. Here are the remains of Grote and Macaulay, the historians; the graves of Chaucer and Spenser; of Goldsmith and Gray and Addison; of Thomson and Southey and Campbell; of Dickens and Thackeray; of Butler and Johnson and Dryden. Handel and Garrick lie here. Wordsworth, Watts, and Wesley are not far away. Shakespeare lies in the Church of Stratford, and Stevenson lies in far off Samoa, but their names and memorials are here. Those in charge of the Abbey have not been narrow. Even our American poets have not been forgotten. The impression produced upon the thoughtful by this marvelous church and place of burial has been stated by Irving as no one else can do it:

> The spaciousness and room of this vast edifice produce a profound and mysterious awe. We step cautiously and softly about, as if fearful of disturbing the hallowed silence of the tomb; while every footfall whispers along the walls, and chatters among the sepulchres, making us more sensible of the quiet we have interrupted. We feel that we are surrounded by the congregated bones of the great men of past times, who have filled history with their deeds, and the earth with their renown.

Westminster Assembly, a famous convocation of divines summoned by the Long Parliament to advise "for the settling of the liturgy and the government of the Church of England." It met at Westminster July 1, 1643, and rose February 22, 1649. Most of the members were Presbyterians. The Assembly drew up a Directory of Public Worship, the Confession of Faith, and the Larger and Shorter Cathechisms. On the restoration of the Stuarts these manuals of faith and practice were rejected in England, but they were retained in Scotland. They are still the accredited standards of faith in the Presbyterian churches of that country, as well as in the Presbyterian churches abroad. See CATECHISM.

Westminster Hall, a building adjoining the British Houses of Parliament on the west. See PARLIAMENT.

Westmoreland, a mountainous county in the northwest of England. It bears somewhat the same relation to London that the White Mountains do to Boston. The famous Lake Region, the rural residence of Southey, Wordsworth, and Coleridge, lies partly in the county. Lake Windermere on the Lancaster border is reputed the most beautiful sheet of water in England. The region is noted for rain, fogs, deep snows, and superb views. From a prosaic point of view it is given over to turnips and pasture for sheep and cattle.

Westphalia, Peace of, the treaty of 1648 that ended the Thirty Years' War in Germany. By this treaty a religious settlement was effected, which extended the terms of the Peace of Augsburg of 1555. The former treaty had given the princes of the empire the right to choose between Catholicism and Lutheranism, but the present agreement added Calvinism as a third alternative. Subjects of the respective states were given three years in which to accept their ruler's religion or leave the state.

Politically Germany was reörganized, but into such a weak federation that it left the diet, the legislative assembly, with practically no power. The independence of Holland and of Switzerland was acknowledged. Sweden received substantial increase of territory on the south shore of the Baltic, while France received a large part of Alsace, and the confirmation of her right to Metz, Toul, and Verdun in Lorraine.

See THIRTY YEARS' WAR.

West Point, a military post on the west bank of the Hudson fifty miles above New

York. It occupies a bold position commanding an extensive view of the river. It was fortified during the Revolutionary War, and was for a time Washington's headquarters. Benedict Arnold sought to betray the post to the British, but was foiled by the capture of Major André.

West Point is noted as the seat of the United States Military Academy. Agitation for the establishment of such an institution began in the Continental Congress as early as 1776. A West Point garrison of invalid veterans gave instruction to young officers as early as 1781. A governmental school for cadets was established in 1794. The school was reorganized much on its present basis in 1801. There were five instructors. The academy is situated on a military reservation of 2,330 acres. Instruction began in abandoned military barracks. An appropriation of $20,000 was made for buildings in 1815.

Each congressional district and territory, including Porto Rico, Alaska and Hawaii, is entitled to have two cadets at the Academy. The District of Columbia has four. Each state has four cadets at large, and eighty-two are allowed from the United States. Two of these are appointed upon recommendation of the vice-president and twenty from among honor graduates of "honor schools." The president is authorized to appoint not to exceed 180 men, from the regular army and the national guard who have served one year. Cadets from congressional districts are appointed through the congressman of the district, those from the State at large through the senators, those from Porto Rico through the resident commissioner and those from the United States at large by the president. Four cadets are admitted from the Philippine Islands. In 1903 $5,500,000 was appropriated for buildings and improvements.

Cadets must be between 17 and 22 years of age; not less than five feet four inches in height at 17 years of age, or five feet five inches at the age of 18 years and upward. They must be free from physical defects and unmarried. Candidates are examined in English grammar, composition and literature, in general and United States history, and in mathematics.

The pay of a cadet is $780 dollars a year and one ration a day or commutation therefor, the total amounting to $1,028.20. Each cadet is required to sign an agreement to serve in the army of the United States eight years. Graduates receive the rank of second lieutenant.

West Virginia, one of the South Atlantic states, is commonly known as "The Panhandle State." Though a member of the south Atlantic group, it is entirely cut off from the sea. The state is very irregular in outline; and is bounded by six states: Ohio and Pennsylvania, north; Pennsylvania, Maryland and Virginia, east; Virginia and Kentucky, south; and Kentucky and Ohio, west. From Ohio it is separated by the Ohio River, while the Big Sandy River forms almost all of the West Virginia-Kentucky boundary.

THE PEOPLE. The population, as returned by the fourteenth census, was 1,463,701; this figure includes 86,345 Negroes and 61,906 people who were foreign born. The inhabitants are distributed in the proportion of 60.9 to a square mile, and are only 18.7 per cent urban. Wheeling, the largest city, has but 56,208 residents; Huntington has 50,177. Two other cities have populations exceeding 25,000, and six have between 10,000 and 25,000 inhabitants. The capital, Charleston, is the third city of the state.

SURFACE AND DRAINAGE. West Virginia has a decidedly hilly, and, in places, mountainous, surface. The Alleghany Mountains traverse the northeastern part of the state, and also form the West Virginia-Virginia boundary. The mountainous area comprises about one-third of the total. The mountains consist of parallel ridges that attain from 3,000 to 4,000 feet, between which are broad valleys having an average elevation of 2,000 feet. Spruce Knob, the highest peak, attains 4,860 feet. To the west of the mountains there is a range of broad, flat topped hills, and westward of the hills the land slopes gently toward the Ohio River.

The larger rivers flow into the Ohio, while the smaller streams flow eastward to the Potomac. The Monongahela River, one of the headstreams of the Ohio (see OHIO RIVER), rises in West Virginia and

flows northward into Pennsylvania. The Little Kanawha, Great Kanawha, Guyondot and Big Sandy are the largest rivers, and all join the Ohio. The Potomac rises on the West Virginia-Maryland boundary and flows southeastward; at Harper's Ferry it is joined by the Shenandoah.

CLIMATE. Because it is shut off from the Atlantic by the mountains, the state does not suffer from the storms of the coast, and, though variations of climate are the rule, extremes are not known. The mean annual temperature is about 45°, and the average annual rainfall—which is well distributed—is 45 inches.

MINERALS. In point of product value, West Virginia is the second mineral producing state of the Union. It ranks next to Pennsylvania in the production of coal and coke, is the first in the production of natural gas, and usually ranks eighth in petroleum production. The above are the principal minerals or products, but iron, pottery and brick clay, glass sand, marble, limestone, sandstone and salt are also found. The total value of the mineral products is approximately $200,000,000 annually.

AGRICULTURE. While the state does not rank high, agriculturally, almost all temperate zone cereals and fruits are grown. First in importance is the corn crop. This is followed by wheat, potatoes, oats, tobacco, buckwheat, hay and sorghum. Apples, peaches and pears are grown in considerable quantities. Dairying has become an important branch of West Virginia's agricultural industry, and good breeds of sheep and swine are raised.

MANUFACTURE. Coal, natural gas and water power are available for manufacture, and though at the last industrial census West Virginia had only 2,785 manufacturing establishments, its importance as a manufacturing state is constantly increasing. Lumber products are first in point of value, West Virginia being second in the Union as a producer of hardwoods. Leather, oil well supplies, iron pipe, galvanized ware, lampblack, glass, tin plate and terneplate, railway cars, clay products and flour are other important commodities.

TRANSPORTATION. The state has more than 4,000 miles of railroads and about 650 miles of navigable waterways. The Great Kenawha and Monongahela rivers have been partly canalized, and the Ohio is an important commercial artery. Other streams are used to float coal barges and log rafts. The most important railroads are the Baltimore & Ohio, Chesapeake & Ohio, Norfolk & Western, Western Maryland, Virginian Railway, New York Central Lines and the Pennsylvania Line.

INSTITUTIONS. A state board of control is in charge of the charitable and correctional institutions, which include the Spencer State Hospital, Huntington State Hospital, State Tuberculosis Sanitarium, West Virginia School for the Deaf and Blind, West Virginia Children's Home, Fairmont State Hospital, McKendree State Hospital, Welch State Hospital, Weston State Hospital, West Virginia Colored Orphans Home, industrial schools for boys and girls, and a penitentiary.

EDUCATION. Elementary education is free for all between the ages of six and twenty-one, and is compulsory between the ages of seven and fourteen. In 1922 the state had 7,419 public graded and 205 public high schools, as well as six normal schools and the University of West Virginia. The latter was founded at Morgantown in 1868. Courses are offered in the arts and sciences, law, medicine, mechanic arts, agriculture, music and military science and tactics; and a summer school is also maintained. In 1922 there were 188 instructors and 2,587 students.

Other institutions of higher learning established in West Virginia are Davis and Elkins College, West Virginia Wesleyan College, Bethany College, Broaddus Institute, Morris Harvey College, Salem College and Linsly Institute.

GOVERNMENT. West Virginia is governed under the second constitution it has had; this was adopted in 1872. It provides for a senate of 30 members and a house of delegates of 94 members.

The executive department is composed of the governor, auditor, treasurer, secretary of state, attorney-general and state superintendent of free schools. The constitution forbids to the governor immediate re-election.

The judiciary is composed of a supreme

court of five justices, circuit courts and such inferior courts as shall be from time to time provided. Supreme court justices are elected for twelve years, judges of circuit courts for eight years.

History. It is supposed that some of the land that is now West Virginia was first explored by a white man in 1669; the Great Kanawha River was discovered in 1671, and the land in the present state was thoroughly explored in 1716 by a company under Governor Spotswood of Virginia. In 1732 a few pioneers crossed the mountains into the new land and there soon came into conflict with the other claimants of the territory, the French. The Indians also made trouble, and at Point Pleasant there occurred in 1774 a sanguinary battle between an alliance of Shawnee, Delaware, Wyandot and Cayuga Indians and Virginia militia and settlers. George III of England had declared the West Virginia land "Indian country," but colonization went forward in spite of him.

Because legislative representation in the territory was based partly on the number of black slaves held, the landholders of eastern Virginia had more influence than the poor settlers of the west. As the Civil War approached the division of interest and sentiment became more marked as between east and west, and the west prepared to separate politically and economically, from the east. Representatives to the Senate were elected in 1861 and accepted by the Senate; a constitution was framed; the name West Virginia was adopted; and in 1863 the new state was admitted to the Union. A certain amount of political and economic turmoil ensued upon separation, but after the adoption of a new constitution in 1872 the state made rapid strides in industrial growth and in the growth of population.

Statistics. The following are the latest reliable statistics available:

Land area, square miles	24,022
Water area, square miles	148
Forest area, acres	8,500,000
Population (1920)	1,463,701
White	1,377,235
Negro	86,345
Foreign born	61,906
Chief cities:	
Wheeling	56,208
Huntington	50,177
Charleston	39,608
Clarksburg	27,869
Parkersburg	20,050
Number of counties	55
Members of state senate	30
Members of house of representatives	94
Salary of governor	$10,000
Assessed valuation of property	$1,225,527,000
Bonded indebtedness	$13,500,000
Farm area, acres	9,569,790
Corn, bushels	20,128,000
Oats, bushels	4,620,000
Potatoes, bushels	4,080,000
Wheat, bushels	3,125,000
Buckwheat, bushels	682,000
Hay, tons	882,000
Tobacco, pounds	6,000,000
Sorghum syrup, gallons	760,000
Wool, pounds	3,200,000
Domestic animals:	
Horses	184,000
Mules	13,000
Milk cows	245,000
Other cattle	366,000
Sheep	728,000
Swine	425,000
Manufacturing establishments	2,785
Capital invested	$339,189,678
Operatives	83,036
Raw materials used	$270,940,596
Output of manufactures	$471,970,877
Petroleum, barrels (42 gals.)	8,173,000
Coal, tons	63,571,000
Miles of railway	4,012
Teachers in public schools	12,107
Pupils enrolled	360,489

Wetaskiwin, Alberta, the capital of Strathcona District, is at the junction of the Canadian Pacific main line and the Calgary-Edmonton branch, 40 miles south of Edmonton. It is the shipping point for a fertile agricultural district, and has manufactories of creamery products, flour and cheese. Near the city are deposits of coal, marl and clay.

Wetaskiwin has graded, high and separate schools, public and military hospitals, a court house and twelve churches. In 1921 the population was 2,480.

Wetherald, Agnes Ethelwyn [pen name, Belle Thistlewaite] (1857-), a Canadian journalist, poet and novelist, was born at Rockwood, Ontario, and was educated in Ontario and in New York. Soon after leaving school she entered the field of journalism and for some time edited the woman's department of the Toronto *Daily Globe.* Later, she was on the staff of the *Ladies' Home Journal* and was a frequent

contributor to *St. Nicholas*. Miss Wetherald wrote the novel, *The Algonquin Maiden,* and several volumes of poems: *The House of the Trees, Tangled in Stars, The Radiant Road* and *The Last Robin.* Her nature poems are noted for close observation, musical rhythm and quiet meditation.

Weyburn, Saskatchewan, the capital of Assiniboia District, is on the Souris River and the Grand Trunk and the Canadian Pacific railroads, 125 miles south of Regina. The city has manufactories of flour, bricks, tiles, machine shop products and creamery products. There are six grain elevators with a combined capacity of 210,000 bushels.

Weyburn has several public parks, good public schools, a library, a collegiate institute and a municipal hospital. The public utilities are the property of the city. In 1921 the population was 3,193.

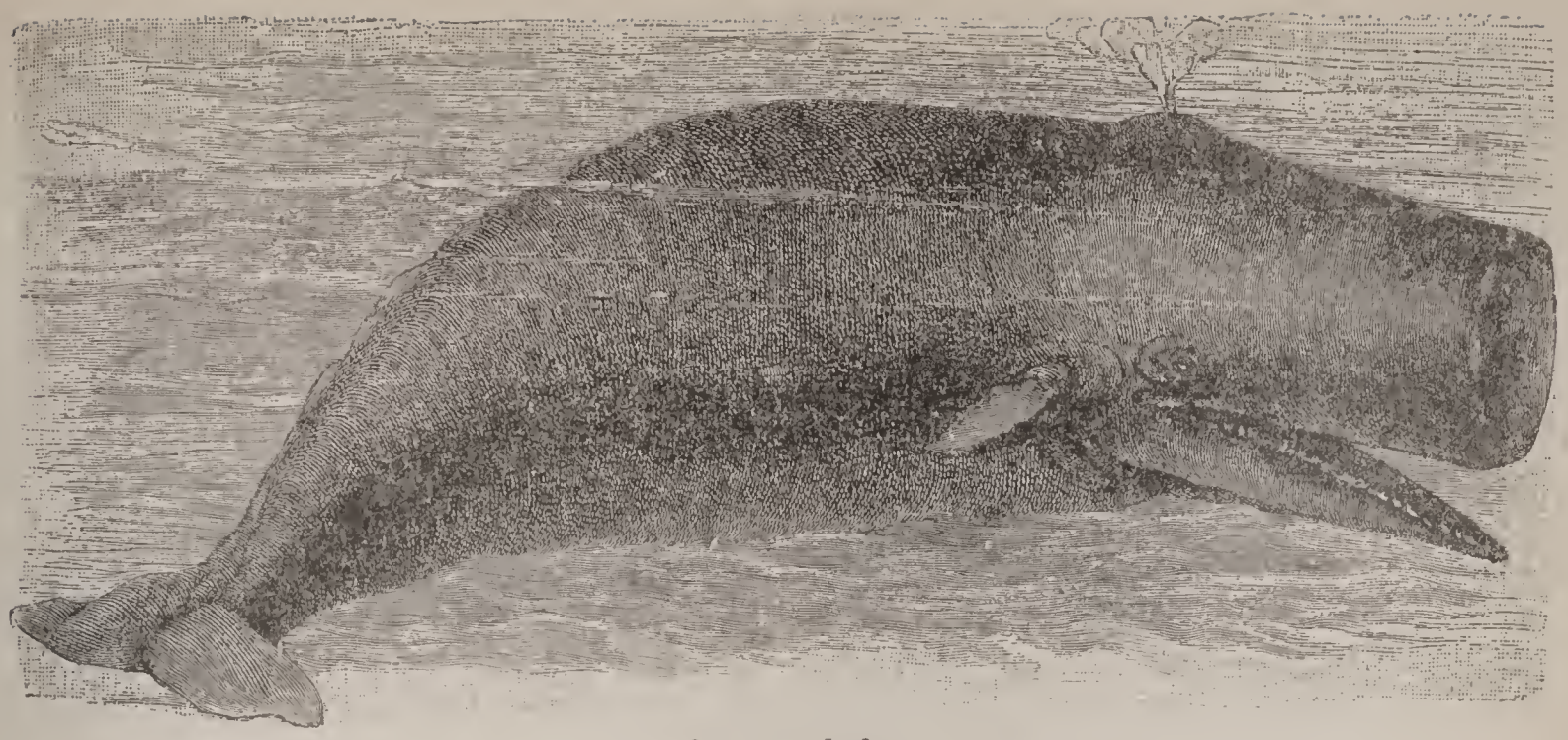
Weyler y Nicolau, Valeriano, Marquis Of Teneriffe (1838—), a Spanish general who, because of his inhuman treatment of the Cubans, became known in the United States as "Butcher Weyler." He was born at Palma, Island of Majorca, and educated at Granada. Entering the infantry school in 1853, he became under-lieutenant in the staff school in 1857. General Weyler was military attaché of the Spanish legation at Washington during the American Civil War. Ordered to Cuba in 1868, he served under Balmaceda during the ten years of war that followed. In 1879 he was appointed Governor-General of the Canary Islands, and Captain-General of the Philippines in 1889. General Weyler succeeded Sr. Campos as Captain-General of Cuba in 1896. The barbarities committed there during his administration but added to an already infamous record for cruelty in the war then in progress on the island, and won for General Weyler his unsavory sobriquet. In 1901-02, he was Minister of War, and was elevated to the post of Minister of Marine in 1905. It was he who quelled the serious Barcelona riots in 1909.

Weymouth, Mass., a manufacturing city on the New York, New Haven & Hartford Railroad, 12 miles southeast of Boston. The principal industries are shoe manufacturing, wool scouring and granite quarrying. The city has also an electrical plant, an art leather factory and a large chemical plant.

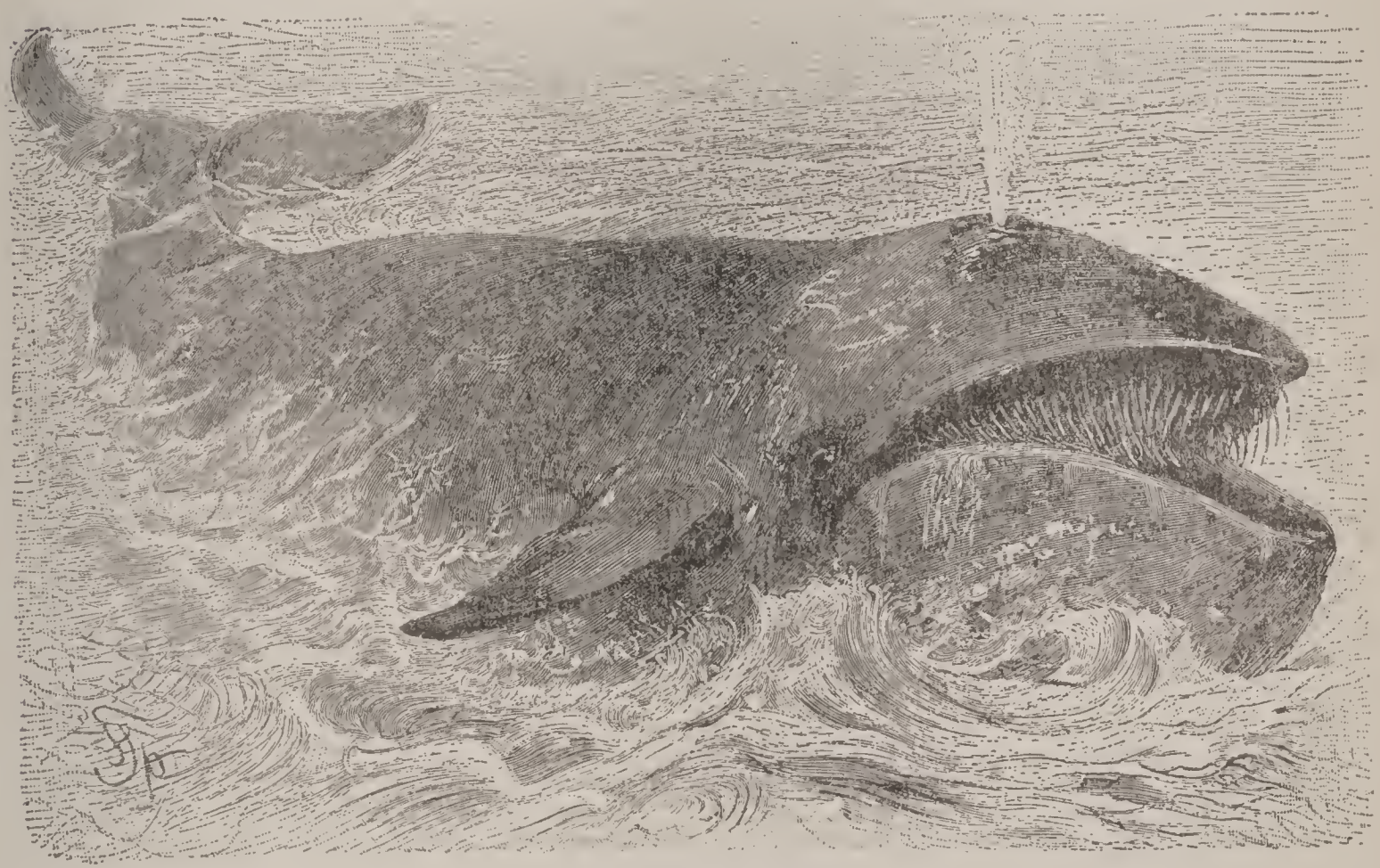
Weymouth has two libraries, three parks, good schools and attractive municipal buildings. The city was founded in 1623 and incorporated twelve years later. In 1920 the population was 15,057.

Whale, the name given to a large family of marine animals. They are not fishes, but are warm-blooded and suckle their young. They are supposed to be degenerate land animals. The hind legs have disappeared altogether. The front legs, which are enveloped in sacs, toes and all, are called flippers. The hide is without scales. The head of the whale contains four chambers, that of the fish but two. The whale has lungs instead of gills. Its lungs are connected with the top of its head by a single nostril through which it blows or spouts. The whale can descend to great depths, possibly a mile below the surface, but must reappear at intervals to breathe. Notwithstanding frequent expositions of its fallacy, the belief of mariners that whales spout through their blowholes water taken in at the mouth is generally shared by landsmen in all countries. This spouting or blowing is nothing more than the ordinary act of expiration. The whale breathes in air at much longer intervals than land animals do. When it rises to the surface for a fresh supply it expels forcibly from its lungs the air taken in at the last inspiration, which is highly charged with watery vapor in consequence of the natural respiratory changes. This, rapidly condensing in the cold atmosphere in which the phenomenon is generally observed, forms a column of steam or spray, which the spectator mistakes for water. It also often happens that the whale begins to blow just as it reaches the surface, thus forcing some water into the air with the blast.

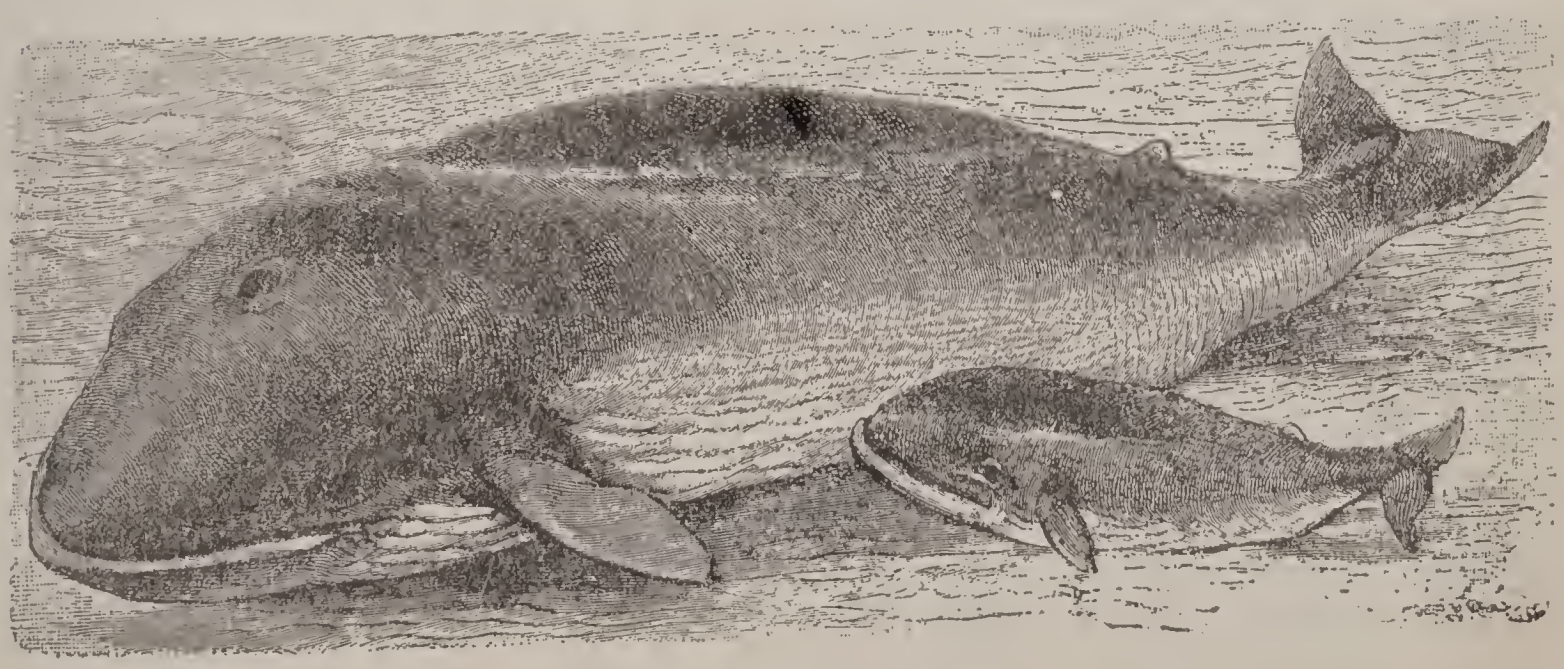
The whale belongs to an order known as cetaceans. The order includes also the dolphin, the porpoise, the grampus, and the manatee or sea-cow. Whales proper are divided into two families, baleen whales



Sperm whale.



Greenland whale.



Baleen or whalebone whale.

THE WHALE.

and sperm whales. The baleen whales have enormous mouths, but they live upon minute shrimps and shellfish found in myriads near the surface of the sea. The roof of the huge, cavern-like mouth is provided with two great, thin, horny plates set edgewise near together. The lower edges of the plates are fringed with a web of filaments, almost filling the mouth. This contrivance enables the whale to strain from the sea water the tiny animals desired for food. In feeding it moves straight ahead. The water, entering the mouth, passes out through the strainers, leaving the little animals lodged on the whale's tongue. The whale rises to the surface to breathe and swallow. The plates split readily into layers known commonly as whalebone. A thick layer of fat between the flesh and the skin is called blubber. It furnishes the whale oil of commerce.

The largest of the baleen whales is the sulphur-bottomed whale of the northern Pacific Ocean. It attains a length of 100 feet, a girth of 40 feet, and a weight of 300,000 pounds. It is the largest animal living, and, so far as we know from fossils, it is the largest animal that ever inhabited the globe. Such a whale yields about 800 pounds of whalebone in strips four feet long, and from 100 to 150 barrels of oil.

Another whale of commercial importance is the bowhead, Greenland, or polar whale of the northern Atlantic and Arctic Ocean. While not over half the size of the sulphur-bottom, it is yet more valuable to the whaler. A large bowhead yields 275 barrels of oil and 3,500 pounds of whalebone. Other whalebone whales are the right whale of Arctic waters, the right whale of the northern Pacific, the hump-back whale, which is the species most frequently seen in crossing the Atlantic, the fin-back whale, and the California gray whale.

Another whale family is represented chiefly by the great sperm whale. The jaws are provided with teeth. The food consists of squids, mackerel, and various fishes. Fifteen different sperm whales or cachalots, as they are called by the older writers, are found in the open sea. They are the principal whales of southern waters. The largest attains a length of eighty feet or over, and it is claimed by some to be the largest of all whales. It has an enormous head, forming about one-half of the entire bulk, and occupying over one-third of the entire length. A blunt snout gives the head a shape not unlike the body of a bottle, hence the name, "bottle-headed," applied to this animal. The greater part of the snout is occupied by a cavity, frequently containing not less than ten barrels of spermaceti. When this whale is caught and towed to the whaler's ship the sailors cut a hole in the snout and dip out the oil with buckets as though from a cistern. The blubber, which is from eight to fourteen inches thick, yields the sperm oil of commerce. Ambergris is found in the large intestine. The mouth is not provided with whalebone.

Whalefishing has long been an important and adventurous industry. Sailing ships, fitted out with boats, implements, and apparatus for trying out oil, were accustomed to set out for a cruise of two or three years, remaining in the whaling region until they had secured a cargo of whale products. Many exciting stories are told of the danger incurred in taking whales with harpoons. When a whale was sighted by the lookout a ship's boat was lowered and manned with a picked crew. An old whaler with an experienced eye stood, harpoon in hand, directing the movements of the boat. When at the right distance from the whale he hurled the weapon with all his force into the mighty beast's flank, often driving it to a depth of several feet. Then followed an exciting chase. The line of the harpoon which lay neatly coiled in the bottom of the boat so as not to entangle the legs of anyone in running out, sang over the edge of the boat; the whale would dive, lead off, double back on its course, try to knock the boat into the air with its powerful tail or fluke, as it was called; but finally, if all went well and the harpoon held, the huge animal gave up the struggle, turned on its side, and was then towed to the ship. The blubber and the whalebone were removed, and the carcass was left afloat for the myriads of seafowl to feast upon.

The present world's annual yield is about 3,000,000 gallons of whale oil, and 1,600,000 pounds of spermaceti, together with

whalebone and sperm oil. The Greenland whale is found usually singly. The sperm whale goes in herds, sometimes of several hundred. There are several smaller whales of commercial importance. The whaling industry has been confined largely to Japan, Norway, Newfoundland, and to New England. New Bedford is the American center. Whaling reached its height about 1854. In that year the American whalers secured 2,315,924 gallons of sperm oil, 10,074,866 gallons of whale oil, and 3,445,200 pounds of whalebone—worth in all $10,802,594. Seven hundred thirty-five American ships were at one time engaged in whaling. The present number is about forty. A single Greenland whale is worth about $13,000. Whalebone is worth thirty-five to forty cents a pound.

With the discovery of kerosene oil for lighting purposes whaling has been less profitable. Persistent hunting has also reduced the number of whales so that it is difficult to secure a cargo of oil, at least in northern waters. A change in methods has also taken place, the harpoon being projected from a gun or small cannon, mounted for that purpose on the prow of the boat.

Whaleboat, a boat having little width and being pointed at both ends, these rising higher than the middle. This type of boat has been much used in whale fishing. They are very useful and are sometimes fitted up as lifeboats. Their shape adapts them to both the surf and rough seas; in the latter case they are steered with a heavy oar which is worked in a crutch on the stern.

Wharton, Anne Hollingsworth (1845-), an American author, was born at Southampton Furnace, Pennsylvania. She was educated privately in Philadelphia, devoting herself principally to the study of the Colonial and Revolutionary periods of the United States. She was historian of the National Society of Colonial Dames of America for some time. She has written entertainingly on these subjects, and among her publications are: *St. Bartholomew's Eve, Through Colonial Doorways, Colonial Days and Dames, A Last Century Maid, Life of Martha Washington, Heirlooms in Miniatures, Salons Colonial and Republican, Social Life in the Early Republic.*

Wharton, Edith Jones (1862-), America's foremost woman novelist, was born in New York City. She was privately educated, and in 1885 was married to Edward Wharton. Although Mrs. Wharton was for many years a contributor of stories to the magazines, it was not until 1899 that *The Greater Inclination,* her first novel, appeared. In 1900, she published *The Touchstone.* These two books attracted general attention. They were thoughtful, brilliant, artistic. In all her later work, Mrs. Wharton has maintained a high artistic standard. Almost all of her novels delineate characters from the world of art and letters, and people of wealth and fashion. Her backgrounds are appropriate to the characters, and are faithfully painted. In a number of her novels, she portrays the result to the individual soul of the pressure of social problems. But while she is one of the so-called psychological novelists, her work is always moving and vivid, never dull. Important in the list of her books are *Crucial Instances, Sanctuary, The Fruit of the Tree, The House of Mirth, Artemis in Actaeon, Tales of Men and Ghosts, The Custom of the Country, Xingu, The Age of Innocence* and *The Glimpses of the Moon.*

Wharton, Francis (1820-1889), an American lawyer and author, was born in Philadelphia. After graduating from Yale, he studied law and was admitted to the bar. He taught English literature, history and law at Kenyon College, studied theology, and was ordained in the Episcopal Church. He was rector of a church in Brookline, Mass., for several years, resigning to accept the professorship of ecclesiastical and international law at Cambridge Divinity School and Boston University. He was counsel for the State Department at Washington from 1885 to 1888, and in the last mentioned year was made editor of the diplomatic correspondence of the United States during the Revolutionary War. He died, however, before this work was finished. He made many contributions to contemporary journals, and was the author of several works dealing with legal subjects, among them *Treatise* on the *Criminal Law of the United States.*

WHEAT

Wheat, an important food plant. Like the other cereals wheat is a cultivated grass. It is supposed to have originated from a grass still found in the vicinity of the Mediterranean. The seeds or grains grow in close four-sided heads indicating a closer relationship to rye and barley than to rice and oats which grow in open panicles. Two or three species of wild wheat, including quack grass, are found in North America.

Egypt was the first country to gain a reputation for wheat raising. It long supplied the Mediterranean countries with breadstuffs. Wheat was brought across the Mediterranean to Rome in large jars packed aboard ship in rows. So many were broken before they came ashore that a large mound, almost a mountain, of pottery fragments grew up at the mouth of the Tiber.

Wheat contains more food in a given bulk than rice or any other grain. It is now the principal breadstuff among civilized nations, and is gaining consumers rapidly. Wheat is an annual plant. It requires less rain than any other cereal. Winter wheat is sowed in the fall. Spring wheat is sowed in the spring. Improved machinery for plowing, seeding, reaping, and threshing, transporting and milling, have not only reduced the cost of production but have made it possible to feed the world with a wheat loaf. The present rapid extension of the wheat area in Australia, Argentina, and the Canadian Northwest indicates that wheat production has made but a beginning.

Students claim that the cost of raising wheat is being reduced rapidly. In 1830 it was considered that three hours of human labor would produce a bushel of wheat; in 1896, so great was the improvement in machinery, 10 minutes or one-eighteenth as much labor was a sufficient allowance per bushel. This means that one man can raise the wheat while the other seventeen men do something else.

The harvesting of wheat goes forward the year around without ceasing. As these lines are read some part of the world is cutting wheat. It is hardly stretching the truth to assert that golden wheat is falling before the sickle somewhere at every tick of the clock night and day from January to December.

WHEAT HARVEST.

January: Australia, New Zealand, and Argentina.
February: India.
March: Upper Egypt, India.
April: Lower Egypt, Mexico, Turkey, Persia, and Asia Minor.
May: Morocco, Algiers, Tunis, Tripoli, Central Asia, China, Japan, and Texas.
June: California, Spain, Portugal, Italy, Greece, Oregon, Alabama, Georgia, Kansas, Colorado, Missouri.
July: France, Austria-Hungary, Roumania, Southern Russia, Nebraska, South Dakota, Minnesota, New England, and Upper Canada.
August: England and Ireland, Belgium, Germany, Holland, Denmark, Poland, North Dakota, Northern Minnesota, Lower Canada, and British Columbia.
September: Scotland, Sweden and Norway, Manitoba.
October: Northern Russia and Siberia.
November: Peru and Southern Africa.
December: Burmah, New Zealand, and Chile.

The six leading states in the production of wheat are Kansas, Illinois, Nebraska, Missouri, North Dakota. In 1919 the yield in Kansas was 151,000,000 bushels. Illinois and Nebraska each produced over 60,000,000 bushels and each of the other states over 50,000,000 bushels.

If sound spring wheat be ground it yields about seventy-two per cent of its own weight of flour, three per cent low grade flour known as "red dog," and twenty-five per cent of bran and shorts. When burned, wheat kernels yield two per cent of ash or earthy matter. Wheat straw contains about five per cent of mineral matter. Wheat is able to stand a cold, wet spring better than other grains. It sprouts at a temperature of 35° F., while corn requires 48° F.

The following tables give the wheat production of the world by countries and that of the United States by states, for 1919. The production of European countries is far below what it was before the war,—and it will be noticed that Russia, which formerly competed with the United States for first place among the wheat-producing countries, does not appear on the list.

WHEAT CROP OF COUNTRIES NAMED.

Country	1919 Bushels
United States	940,987,000
Canada	196,361,000
Guatemala	252,000

Steam Plow

Steam Threshing (4,700 bushels in a day)

WHEAT RAISING IN THE WEST

Argentina	184,268,000
Brazil	.....
Chile	21,591,000
Uruguay	.....
Belgium	9,895,000
Czecho-Slovakia	.....
Denmark	.....
France	177,978,000
Germany	.....
Italy	169,563,000
Luxemburg	.....
Netherlands	6,015,000
Norway	1,139,000
Portugal	.....
Spain	133,939,000
Sweden	.....
Switzerland	3,524,000
United Kingdom	.....
British India	280,075,000
Japan	29,800,000
Korea	7,144,000
Algeria	25,559,000
Egypt	.....
Morocco	.....
Tunis	7,000,000
Union of South Africa	10,150,000
Australia	75,138,000
New Zealand	6,659,000
Totals, 17 countries	2,267,074,000

UNITED STATES.

State	Bushels
Maine	228,000
Vermont	252,000
New York	11,178,000
New Jersey	1,962,000
Pennsylvania	29,055,000
Delaware	1,740,000
Maryland	10,665,000
Virginia	12,508,000
W. Virginia	5,400,000
N. Carolina	7,225,000
S. Carolina	1,836,000
Georgia	2,520,000
Ohio	54,440,000
Indiana	46,020,000
Illinois	65,675,000
Michigan	20,237,000
Wisconsin	7,355,000
Minnesota	37,710,000
Iowa	23,675,000
Missouri	57,886,000
N. Dakota	53,613,000
S. Dakota	30,175,000
Nebraska	60,675,000
Kansas	151,001,000
Kentucky	42,029,000
Tennessee	7,290,000
Alabama	1,242,000
Mississippi	504,000
Texas	31,360,000
Oklahoma	52,640,000
Arkansas	3,230,000
Montana	10,729,000
Wyoming	4,008,000
Colorado	17,645,000
New Mexico	6,100,000
Arizona	1,204,000
Utah	3,682,000
Nevada	668,000
Idaho	18,705,000
Washington	40,100,000
Oregon	20,495,000
California	16,335,000
United States	940,987,000
Grand total	3,208,001,000

The annual wheat yield of the United States computed for a series of years is about 7.9 bushels per person.

See DURUM WHEAT; PLOW; HARROW; REAPING; THRESHING MACHINE; FLOUR; GLUTEN; BREAD; YEAST; ELEVATOR.

Wheeler, Benjamin Ide (1854-), an American educator. Born in Randolph, Massachusetts, he studied in Colby Academy, was graduated from Brown University, and studied afterwards in the universities of Leipsic, Heidelberg, Jena, and Berlin. He was instructor in Brown University from 1879 to 1881, in Harvard from 1885-86; in Cornell he was appointed instructor in philology in 1886, and instructor in Greek two years later. In 1896 he took charge of the American School of Classical Studies of Athens, Greece. He was president of the University of California from 1899 to 1919. He was one of the editors of Johnson's *Universal Cyclopaedia,* also of Macmillan's *Dictionary of Philosophy and Psychology.* He is the author of *The Greek Noun-Accent, Analogy and the Scope of Its Inflence in Language, Organization of Higher Education in the United States,* and *Life of Alexander the Great.*

Wheeling, the county seat of Ohio County, West Virginia, on the Ohio River. A part of the city is built on Zane's Island and is connected with the main part of the city by suspension and steel bridges. The manufactures are iron, steel, and lumber products, leather, pottery, glass, tobacco, beer, wagons and carriages. Important buildings are the courthouse, the city hall, and the government customhouse. The educational institutions are Linsly Institute, Mount de Chantal Academy, Saint Joseph's Academy, and two business colleges. Beth-

any College and the West Liberty State Normal School are located a short distance north of the city. The first settlement was made in 1769; the town was incorporated in 1806. In 1920 the population was 54,322.

Whelk, hwĕlk, a shellfish, in appearance not unlike a large snail of the twisted species. It swims and clings to the rocks along the coasts of Europe. It is used for food as well as bait for fish. The whelk has a tongue like a file. With this it is able to bore a hole with mathematical precision in the shell of a mussel through which it sucks out the soft parts, all with an economical and skillful expenditure of labor equal to that with which a squirrel extracts the kernel of a nut. The whelk knows where and how to bore to get at the interior with least effort and to greatest advantage. One species of British whelk, for they are all related to the Phoenician murex or whelk yielding Tyrian purple, contains a drop of dye suitable for marking linen. Marks made with it in sunlight are at first light green, turning, on further exposure, to deep green, sea green, watchet-blue, and purplish-red. After washing in soapsuds the color intensifies once more into an indelible crimson that, once dried, cannot be washed out.

Whetstone, hwĕt′stōn, a stone used for sharpening edged tools. The distinction between a whetstone, a hone, an oilstone, and a scythe-stone is not clear. Since 1823 our scythe-stones have been made chiefly in Grafton County, New Hampshire. Our fine-grained oilstones are quarried near the Hot Springs of Arkansas. They are considered a deposited sediment of fine-grained quartz. The Arkansas oilstone is in demand in Europe. Mechanics consider it unsurpassed. Indiana produces a coarser oilstone of good quality. The American production of these stones amounts to about $200,000 a year. A high grade stone is obtained in Turkey. See GRINDSTONE.

Whey. See CHEESE.

Whigs, the name of a political party. The term is of uncertain derivation. It originated in Scotland, where it was applied to the peasantry who were opposed to the high-handed proceedings of the crown. Transferred to England it became the name of the political party that stood for parliamentary government and democratic tendencies in particular. At the time of the American Revolution, the English Whigs, led by William Pitt and Edmund Burke, maintained the justice of the American cause. The Tories may be described in brief as the party in favor of the royal authority. The terms Whigs and Tories were transferred to American soil. The American patriots called themselves Whigs. Those who opposed the Revolution were called Tories. In British politics, the Whigs were succeeded by the Liberal party, the Tories by the Conservative party. In American politics, the term Whigs was revived in 1834. A combination of Northern and Southern Whigs was formed under Adams and Clay in favor of a policy of internal improvements and what is known as a broad or loose construction of the Constitution. In other words, the Whigs believed in enlarging the scope of the national government. They elected Harrison and Tyler. Among the prominent leaders of the party were Clay, Webster, Choate, Seward, Weed, Greeley, Stevens, Toombs, Ewing, Giddings, and Corwin. In 1852 the Whigs were disrupted. The Northern Whigs became Free-Soilers and later Republicans; the Southern Whigs became known as the Southern Democrats.

Whin. See GORSE.

Whipple, Henry Benjamin (1822-1901), an American Protestant Episcopal bishop. He was born in Adams, New York, and took priest's orders in 1850. He was rector of Zion Church in Rome, New York, from 1850-57, and of the Church of the Holy Comforter in Chicago for two years. In 1859 he became first bishop of Minnesota. Bishop Whipple labored among the Indians and insisted at all times that justice be meted out to them by the whites. He is known as "the apostle to the Indians," and among the red men he was called "Straight Tongue." He brought the Sioux massacre of 1862 to an end, and in 1876 the Sioux Treaty, which opened up territory in Dakota to the white settlers, was secured by him. He sympathized with the Indians because of a perfect understanding of their character, and this sympathetic attitude is reflected in his treatmen-

of the Indian problem in *Lights and Shadows of a Long Episcopate.* Because of his tolerance and magnanimity, Bishop Whipple was admired and respected throughout the country and in England as well.

Whip-poor-will, a bird of the goatsucker family. The plumage is mottled, barred, and streaked with black, buff, and white in a way difficult to describe. The mouth is short, wide, and weak. The bill is surrounded with bristles, the more readily to catch insects which are taken at evening twilight on the wing. The whip-poor-will ranges throughout eastern North America, wintering from Florida southward. It nests on the ground or on leaves in thickets or even in open places, possibly in the shade of an oak. Eggs, two; dull white, with lilac markings and gray spots. When disturbed, the whip-poor-will rises with a silent broad expanse of wing and courses away into the underwood in a sort of ghostly fashion that unsettles one almost as much as the sudden spring of a partridge or a covey of quails. At sunset the whip-poor-will emerges from concealment and courses swiftly near the ground taking his supper of insects. A little later or between flights he perches on a low limb and calls *whip-poor-will, whip-poor-will,* with an energy not to be expected from so shy and soft-mannered a bird. The call is not so difficult to imitate as is a preliminary cluck before each call, so indistinct as to be heard only when the listener is near the performer. It is suggestive that something in the bird's throat is out of order. When the last glow of twilight has faded, the whip-poor-will retires for the night. It is heard and seen less often at dawn of day.

Whirlwind, an upright whirling column of air. The whirlwind varies from a trifling roadside eddy that lifts one's hat and picks up bits of straw, to a column measuring possibly a half a mile in diameter and extending far into the regions of the clouds above. In either case, the cause is the same. Gusts of air or powerful currents of wind moving in contrary directions meet, and, as they shoulder past each other, they give a twirling motion to an upright column of air formed from their rubbing edges. Of a gusty day numerous small eddies form near the ground. These surface whirlwinds create quite as much amusement as annoyance, but the tornado that prevails between the one-hundredth meridian and the Atlantic is to be dreaded. It is a terrific whirlwind formed in the upper regions by battling currents of cold and warm air. It is a gigantic column of whirling air usually spreading above into the shape of a top. It is so dense that it settles of its own weight, but rebounds like a balloon when it strikes the earth. Seen from a distance, a tornado is a blue-black, funnel-shaped cloud with a long, slender, snaky, twisting, twirling tube descending from its apex. In this region the tornado is formed usually at the close of a sultry day. It approaches from the southwest, traveling across the face of the country in bounds and leaps. Such a storm may be traced, not by a continuous belt of devastation, but by circles or short paths at intervals of a few miles. Here it drops on a group of farm buildings and whirls them about, strewing homes, stock, granaries, horses, household goods, grain, and live stock, and even persons round and round in a circle perhaps half a mile in diameter. Then, leaping over intervening farms, the lashing column dips into a lake and, gathering up water, fish, and boats, drops them in the surrounding woods. At the next leap destruction lands in the midst, it may be, of a thriving town. No building is strong enough to stand. There is a theory that the center of the rotating column is a more or less complete vacuum in which buildings explode from internal air pressure; but, however that may be, in a few seconds of time thousands and thousands of dollars' worth of property are reduced to a shapeless mass of rubbish. The genuine tornado or whirlwind is quite as apt to leap over a high place and settle into a hollow as to do anything else. It travels toward the northeast and rotates in a direction opposite to that of the hands of a watch when laid on a table face upward.

The whirling sandstorm of the Sahara and other regions is a whirlwind that has caught up the sands of the deserts. Camels seek safety by kneeling and stretching out their long necks in the sand, and their drivers lie flat till the whirlwind has passed by. The dangerous squalls and waterspouts

encountered at sea are similar columns of air. The water in the wide upper part is from the land. That in the lower part is twisted up from the ocean. Myriads of fish are swept up in this way and not infrequently carried over the land. A waterspout passing at a safe distance, one end in the clouds, the other in the sea, is a magnificent spectacle; but a tornado in an inhabited country is fraught with too great loss of life and property to create any feeling but that of awe and terror.

The United States Weather Bureau applies the term cyclone to a wheel-like rotation extending over a circle, it may be 200 or 300 miles in diameter; to the ordinary observer it is nothing but a change in the direction of the wind.

The whirlwind is a favorite figure in Eastern literature. The Bible is full of references. "Elijah went up by a whirlwind;" "The Lord answered Job out of the whirlwind;" "Destruction cometh as a whirlwind;" Wheels like a "whirlwind;" "The whirlwind of the Lord is gone forth;" "They have sown the wind and they shall reap the whirlwind," are expressions showing that the tornado was well known to the ancients. Shakespeare does put a "whirlwind of passion" into Hamlet's heart, but England is a country of straight-away wind. Dickens, a very master of descriptions of gusts and winds, from the destructive hurricanes that uproot trees and blow off chimney pots to the veriest whisper breathed through keyholes, was unfamiliar with the whirlwind.

See WIND; TYPHOON; SIMOON; CHINOOK; CYCLONE.

Whiskey, an alcoholic beverage. The name seems to be a corruption of the Celtic usquebaugh. To understand the manufacture of whiskey the reader should first consult the articles on malt and beer. The process of making whiskey is called distilling in distinction from that of making beer or brewing. Whiskey is about half alcohol. It is made from starchy substances by three steps: First the action of malt, which changes starch to sugar; second, the action of yeast, which changes sugar to alcohol; and third, distilling, by means of which the alcohol or whiskey is separated from the other products.

Scotch and Irish whiskey are made from malt. American distillers use from five to ten per cent of malt only. Ground wheat, corn, or rye, potatoes, or any starchy substance is boiled at a high temperature into a starchy mash. Malt is then introduced to change the starch into sugar. Molasses and sugars may be added to increase the volume of the now sugary mash. This may be of two sorts, a sweet or a sour mash, but in either case yeast is added to induce fermentation. Up to this point, the process is not so different from beer making or brewing, but in making whiskey the process of fermentation is carried on until all the available sugar is changed into alcohol. The next step is distilling. The alcoholic mixture is heated in a boiler. Alcohol, as is well known, evaporates at a low heat. Its vapor is conducted through a pipe surrounded by cold water and the product is caught in a tank. This cooling pipe is usually coiled. It is known as a worm.

Previous to the adoption of the 18th amendment to the Constitution the manufacture of spiritous and malt liquors in the United States had become an extensive industry. The effect of prohibition upon distilleries may be seen from the following table, which shows the number of gallons of distilled spirits upon which government taxes were collected in the years listed:

Year	Gallons
1913	193,606,258
1916	253,283,273
1917	286,085,464
1918	178,833,799
1919	100,778,541
1920	82,331,887
1921	87,896,450

Illinois has been the leading state in the manufacture of distilled spirits and Kentucky has been a close second, followed by Indiana.

Distilled liquors are required to pay heavy taxes to the general government. Those not intended for immediate consumption may be stored in bonded warehouses for a time and the payment of duty may be deferred. Alcohol needed for strictly scientific purposes may be released from bond and supplied for laboratory use without payment of duty. Denatured alcohol for use in the arts is also free from taxation.

Of the various kinds of whiskey, Bourbon, made from corn, malt and rye, takes its name from Bourbon County, Kentucky. Rye is made from rye and malt. Rum is distilled from fermented molasses. A number of aromatic herbs and seeds are used to give desired flavors and odors, as juniper berries, caraway, peppermint, artemisia and anise. Whiskey that is newly distilled is without color, but after being stored in wood for several years it acquires the color familiar to everyone. All brands of whiskey improve with age. See ALCOHOL; BEER; DISTILLING.

Whiskey Insurrection, a revolt against the excise laws passed by Congress, which imposed a tax on whiskey at the rate of seven cents per gallon. These laws were first passed in 1791, and they were immediately resisted, especially by the people of western Pennsylvania, who depended largely upon the manufacture of whiskey for a livelihood. Upon their refusal to submit, President Washington sent about 13,000 militia to the scene in 1794, and the disturbance was readily quelled. This outcome established the precedent of a federal excise.

Whistler, James Abbott McNeill (1834-1903), an American artist trained in France, celebrated for his paintings and etchings. He is almost as well known for his clever, biting satire, and his great eccentricity. Whistler was born in Lowell, Massachusetts; his father was a distinguished army officer, his mother a woman of great refinement. After being dismissed from West Point for failure to attend to the routine work which he hated, Whistler went to Paris in 1856 to study painting. His exquisite etchings won him fame first; of these he has done about 400. Whistler believed that painting should appeal to the eye only,—that the idea or emotion was of no consequence. He likened painting to music, and gave his pictures such names as arrangements, nocturnes, and symphonies. Quite indifferent to what people thought of him, he quarreled with everybody. Ruskin, writing of one of his nocturnes, expressed amazement at his having the impudence to "fling a pot of paint in the public's face." Whistler sued for damages, and was awarded a farthing, which he wore proudly on his watch chain the rest of his life. The costs which fell to Ruskin to pay were raised by public subscription. Whistler was very versatile, painting portraits, landscapes, and water-color sketches with equal ease and ability. Among his best-known portraits are those of his mother, in the Luxembourg; of *Carlyle,* in the Glasgow Museum; of *Rose Whistler,* in the Boston Museum; and of *The Lady in a Fur Jacket. Westminster Bridge, The Ocean, Trafalgar Square,* and *The Falling Rocket* are celebrated landscapes. Whistler is known also for his satirical books, *Ten O'Clock, The Baronet and the Butterfly,* and *The Art of Making Enemies.* Though Whistler's biting tongue made him unpopular with the public, his intimate friends pay his true character a glowing tribute.

White, Andrew Dickson (1832-1918), an American diplomat, educator, and author. He was born in Homer, New York, was graduated from Yale in 1853, and studied in the College of France, Paris, and at the University of Berlin. During the Crimean War he was an attaché of the United States Legation at St. Petersburg for a short time. He became professor of history and English literature in the University of Michigan in 1857. Six years later he was elected to the New York state Senate, having moved to Syracuse. In 1867 he was made president of Cornell University where he also held the chair of history until 1885. When he donated his historical library of 30,000 volumes and 10,000 pamphlets and manuscripts to the library of Cornell he was made president of the new school called the White School of History and Political Science. He was minister to Germany 1879-81, and to Russia 1892-94; commissioner to investigate the Venezuela boundary question in 1896; ambassador to Germany 1897-1902; and president of the United States delegation to The Hague Peace Conference in 1899. He is the author of: *Outlines of a Course of Lectures on History, Syllabus of Lectures on Modern History, History of Warfare of Science against Theology,* and *Paper Money Inflation in France.*

White, Edward Douglas (1845-1921), an American jurist, born in the parish of Lafourche, Louisiana, and educated at

the Mount St. Mary's College, Maryland, and at the Jesuit College in New Orleans. During the Civil War he served in the Confederate army. After the war he took up the practice of law and rose rapidly in his profession. From 1891 to 1894 he was United States senator and in 1894 he was appointed associate justice of the United States Supreme Court by President Cleveland. In 1910 he was appointed chief justice to succeed Justice Fuller,

White, Richard Grant (1821-1885), an American scholar and critic. He was born in New York; at the age of eighteen he was graduated from the university of that city. After studying medicine and law he entered journalism, winning distinction as a critic of music, painting, and the stage. From 1863-67 he wrote his famous *Yankee Letters* for the *London Spectator*. These commentaries on events in the United States at that critical time did much to win favor in England for the cause of the North. White was a tireless student of Shakespeare. The Riverside edition of the great dramatist's plays is one of White's best-known works. He published also *Shakespeare's Scholar, Memoirs of William Shakespeare,* and *Studies in Shakespeare.* Other of his works are *Words and Their Uses,* and *Every Day English. The New Gospel of Peace* is a celebrated satire; *The Fate of Mansfield Humphreys* his only novel. White, though of very pronounced opinions which he upheld rather violently, was a critic of discernment, and a noteworthy scholar.

White, William Allen (1868—), an American journalist and novelist, born at Emporia, Kansas, and educated at Emporia College and the University of Kansas. In 1895, he became the owner and editor of the Emporia (Kansas) *Gazette,* which under his management has been one of the most influential journals in the state. White's editorial, *What's the matter with Kansas?* in 1896, brought him into notice throughout the country. His novels are of a high order. Those best known are, *The Real Issue, The Court of Boyville, Strategems and Spoils, In Our Town, A Certain Rich Man, God's Puppets.*

In 1912, he was chairman of publicity of the Progressive National Committee. As a keen observer, and critic of his times, White holds a foremost place.

Whitecaps, a name applied in the United States to bodies of armed, masked men who take the law into their own hands and go about at night enforcing justice, so-called, by punishing people they allege to be offenders. The name was properly given first to a band of outlaws in southern Indiana who wore paper masks and coats made of flour sacks with holes cut for the head and arms. The "night riders," an association of tobacco farmers in Kentucky and northern Tennessee, organized to fight the Tobacco Trust, is the most recent example of "whitecaps." They committed horrible outrages against the men who refused to join the association, burning warehouses, shooting whole families, and whipping women who had upheld their husbands.

Whitefield, hwĭt'fēld, **George** (1714-1770), a noted English evangelistic preacher. He was born at Gloucester and educated at Oxford. Here he was a member of a society of young men including the Wesleys. He was ordained a deacon and priest, but instead of settling down to a parish he became an open-air preacher. He traveled extensively in England, Scotland, and Wales, holding what would now be called revival meetings. In 1737 he joined the Wesleys in Savannah. He made successive trips to America, preaching along the coast from Georgia to New England. On one of these occasions he was heard by Benjamin Franklin at Philadelphia. Whitefield incurred the hostility of Harvard and the New England Puritans. He fell out with the Wesleys also in regard to points of doctrine. He continued active to the very day of his death. He died at Newburyport, Massachusetts, and was buried beneath the pulpit of the Federal Street Church.

Whitefish, a name given to a dozen or more species of fresh water fish. They are found chiefly in the lakes of the north temperate and Arctic zones. They are related to the salmon and trout. The common whitefish taken in the Great Lakes and vicinity attains a length of two feet. The back is olive tinted, the under parts white. It lives on snails, crayfish, insects, etc. The

whitefish seldom bite at a hook. They are caught by seines set near the shore or by gill nets set in deep water and weighted to the bottom. The taking of whitefish forms an important industry about the Great Lakes. They are packed in ice usually and sent to market fresh. They have been pursued so persistently even on their spawning grounds that the American catch has fallen off from 21,463,000 pounds in 1880 to 5,094,014 in the year of the last census. The Canadian take has suffered similarly. Every effort is being made by the fish commissioners of the general government and the several states to restock the lakes by hatching spawn in artificial fish hatcheries. See FISH; TROUT; SALMON.

White House. See WASHINGTON, D. C.

White Lead, a preparation of lead used as the basis of white paint. It is prepared by subjecting sheets of lead to the action of acetic acid, an active principle present in vinegar. In making white lead one method is the following: Sheets of lead shaped like pies are piled on one another in earthen pots containing a little acetic acid. The pots are stacked in a pit which is covered with spent tanbark and allowed to stand for three months. A little over half of the metal will be found converted into white lead. As it is not subject to atmospheric influences, it makes, with linseed oil, the best of white paint for the protection of wooden surfaces. See PAINT.

White Mountains, often called "The Top of New England," comprise a group of lofty summits belonging to the Appalachian system. They occupy the north central part of New Hampshire, extending across the state in a northeasterly direction. The mountains rest upon a plateau about forty-five miles long, thirty-five miles wide and 1,600 feet above the sea level. Rising from this plateau are over twenty whose altitude exceeds 5,000 feet, and a number of others which exceed 4,000 feet. Mount Washington, 6,293 feet, is the highest and, next to Mount Mitchell in North Carolina, the highest summit in the Appalachian system. The base and slopes of the mountains are forested, but above the tree line the bald summits of primeval rock reflect the sun in such a manner as to give them the appearance of being covered with snow. Hence the name "White Mountains" or "White Hills."

The mountains are clustered in two groups, the eastern being known as the White Mountains and the western as the Franconia Mountains. The Presidential Range of the White Mountains is so called because most of the summits are named for the Presidents; Washington, Adams, Jefferson, Monroe, Madison, Clay and Boot-Spur exceed 5,000 feet, and Franklin, Clinton, Pleasant and Webster exceed 4,000 feet. Mount Washington is the chief object of interest. The summit, from which one of the most magnificent views in America may be obtained, is reached by carriage and by railway, the first cog railway in the world. A good hotel at the summit cares for those who wish to spend a day or more and thousands of tourists make the ascent every season.

Crawford Notch, a deep defile with walls 2,000 feet high, traverses the White Mountains and forms the channel through which the Saco River wends its way to the sea. This defile affords the wildest mountain scenery east of the Rocky Mountains.

Mount Lafayette, 5,269 feet, is the highest summit of the Franconia Range; Moosilaukee, Liberty and Profile each exceed 4,000 feet. The chief object of interest in the Franconia Mountains is the Profile or Old Man of the Mountains, a remarkable representation of the human face formed by the projection of three rocks from the side of a cliff on Cannon or Profile Mountain. The profile is about 1,500 feet above the road, from which it may be seen, and is over eighty feet long. For centuries before these mountains were known to white men this profile was an object of veneration for the Indians, and it is supposed that from it Hawthorne derived the inspiration for his beautiful allegory *The Great Stone Face.*

Other objects of special interest in those mountains are Echo Lake—so inclosed in hills that sounds are audibly repeated four times, and the Flume, a narrow gorge through which flows the Pemigewasset.

For more than a century the White Mountains have been the playground of New England. A bracing atmosphere,

sparkling streams, enchanting waterfalls and a forest especially suited to camp life —all attract the traveler who desires to escape the turmoil of the city.

White Plains, N. Y., the county seat of Westchester County, is on the Bronx River and on the New York Central Railroad, 22 miles northeast of New York City. The industrial interests of the city are not extensive. Prominent features are the state armory, Y. M. C. A., Carnegie library, Westchester County Law Library, Burke Foundation and White Plains Hospital.

The city is now interesting chiefly for its historical interest as the scene of the Battle of White Plains, fought on October 28, 1776. Washington had been holding Manhattan Island, but on the 23d of October he moved almost all of his troops to White Plains. On the 28th Howe sent 4,000 men against Washington's outpost of 1,400. In the battle that ensued about 140 Americans were killed and the remainder withdrew to the main camp.

Whitewash, a composition of quicklime and water used for coating rough surfaces. It is an excellent germ killer much used for the interior of chicken houses, etc. In the more thrifty parts of the Southern States, the cabins seen from a passing train are neatly whitewashed. A finer whitewash, made of whiting, glue, and water, is used for plastered walls. In the game of politics, a "whitewash" is a report of an investigating committee that hushes up a matter and reports favorably upon the wrong doings of a delinquent. See LIME.

Whitlock, Brand (1869——), an American diplomat, born at Urbana, Ohio. He was for several years a newspaper reporter in Toledo and Chicago. He then began the practice of law in Toledo, where he wrote several books on the political and business outlook which attracted wide attention. He was mayor of Toledo four successive terms, refusing the fifth nomination in 1913, to become United States minister to Belgium. As representative of the largest neutral power, Mr. Whitlock was placed in a difficult situation at the outbreak of the Great War, but he won the admiration of the world by his tact and firmness in the discharge of his duties and by his services to humanity. In 1919, he resigned to gain a period of rest. Later in the year he was appointed Ambassador to Italy. His books include *Belgium Under German Occupation, The Enforcement of Law in Cities, The Turn of the Balance, Abraham Lincoln* and *Forty Years of It.*

Whitman, Marcus (1802-1847), an American missionary and pioneer, born at Rushville, N. Y. He studied medicine and practiced four years, when he was appointed missionary to the Indians on the Oregon. Whitman, his wife and two companions established a mission at what is now Walla Walla, Washington, in 1836, bringing with them the first wagon that crossed the Rocky Mountains. Other missionaries followed, and disagreements between the missionaries and the Home Board led Whitman to start for Boston in midwinter, walking over most of the western part of his journey. He returned with about 200 settlers. Whitman was killed by Indians in 1847.

Whitman, Walt (1819-1892), an American poet. He was born at West Hills, Long Island, May 31, 1819, and died at Camden, New Jersey, March 26, 1892. He attended the public schools of Brooklyn, ran errands for a doctor and a lawyer, learned to set type, and taught several terms of district school in Long Island. He next got into editorial work. Possessed by unrest he traveled afoot in the United States and Canada and supported himself for a time by working at carpentry. In 1855 he published his first volume, *Leaves of Grass.* During the Civil War, he went to the front to assist a wounded brother, and remained in the service as a hospital nurse. On the return of peace he obtained a clerkship at Washington. In 1873 he was overtaken by partial paralysis and took up his residence in Camden where he continued to live up to the time of his death. Other small books, as *Drum Taps* and *November Boughs,* are now included in a single volume with *Leaves of Grass.*

Whitman was a large, hearty, robust young fellow. He slouched about in coatless attire—his shirt open at the neck, hands in his pockets. Or, if he dressed otherwise, his cravat was tied in a negligent fashion

and his vest half buttoned. He affected a world-wide, breezy, intellectual swing, from the Atlantic to the Pacific, as becoming the heir of all the ages. Maintaining that to the pure all things are pure, he introduced topics bordering, if not on the obscene, certainly on the indelicate. In this respect his poetry stalks through society full-statured and unclad, yet claiming the blessed privilege of a babe to go caressed and uncriticized. His poems have been abused by the prudish and glorified by his admirers with equal unreason. One of the most impassioned criticisms of Whitman is a small volume by John Burroughs. Whitman's finest poem is the burst of agony called forth by the assassination of President Lincoln, beginning:

O Captain! my Captain! our fearful trip is done.

The following passage from *Leaves of Grass* illustrates Whitman's chanting style and is a partial statement of his creed:

Dead poets, philosophs, priests,
Martyrs, artists, inventors, governments long since,
Language-shapers, on other shores,
Nations once powerful, now reduced, withdrawn, or desolate,
I dare not proceed till I respectfully credit what you have left, wafted hither:
I have perused it—own it is admirable (moving awhile among it),
Think nothing can ever be greater—nothing can ever deserve more than it deserves;
Regarding it all intently a long while—then dismissing it,
I stand in my place, with my own day, here.

Whitman is poetry's butcher. Huge, raw collops slashed from the rump of poetry—and never mind gristle—is what Whitman feeds our souls with. As near as I can make it out, Whitman's argument seems to be, that, because a prairie is wide, therefore debauchery is admirable, and because the Mississippi is long, therefore every American is God.—Sidney Lanier.

Whitney, Adeline Dutton Train (1824-1906), an American story writer. She was born and educated in Boston. In 1843 she was married to Seth D. Whitney. She contributed articles and poems to various periodicals, but did comparatively little writing until about 1860. Her stories are for young people. Usually they are wholesome and entertaining and go deeper into the problems that come to girls than does the average story. *Faith Gartney's Girlhood, A Summer in Leslie Goldthwaite's Life, Hitherto, Real Folks, We Girls, The Other Girls,* and *The Gayworthys* may be mentioned.

Whitney, Eli (1765-1825), an American inventor. He was born at Westboro, Mass. He earned his own way through Yale, partly by teaching and partly by working at the trade of carpentering. After graduation in 1792 he went to Georgia to teach. Here he became an inmate of the family of the widow of General Nathaniel Greene of Revolutionary fame. While residing on her estate and reading law he became interested in the problem of extracting the seed from the ripened cotton. The utmost that a slave could do in a day was to pick the fiber free from five or six pounds of cotton Whitney invented a rotating saw gin by which a single hand, with the assistance of a horse to pull the sweep, could twitch the fiber of 300 pounds through a wire screen and leave the seeds behind. He obtained a patent in 1794, but, through carelessness in exposing his model, other parties already had machines in use or on the market. The state of Carolina voted him $50,000 in recognition of his services. This sum and all he made out of the gin he spent vainly in lawsuits to protect his rights from infringement. All told, he gained fame but no money from the cotton gin. In 1798 he was awarded a government contract for the manufacture of firearms. He settled down at Whitneyville, Connecticut, and made a fortune in this business. He invented no end of ingenious labor-saving machinery. He is said to have been the first manufacturer to adopt the plan of division of labor. He kept each mechanic at work making a single part of the guns. See COTTON.

Whitney, Sir James Pliny (1843-1914), a Canadian attorney and statesman, was born at Williamsburg, Ontario, and received his education there. He was admitted to the Ontario bar in 1876, rose steadily in his profession, and in 1890 was appointed King's Counsel. In 1888 he was elected to the Ontario legislature, and in that body he led the Conservative opposition from 1896 to 1905. In 1905 Sir James was chosen premier of Ontario, hold-

ing that post until his death. In 1910 he served on the Ottawa Interprovincial Conference. Sir James was knighted six years before he died.

Whitney, Josiah Dwight (1819-1896), an American geologist, was born at Northampton, Mass. After graduating at Yale, he devoted himself to the study of geology and became state geologist of California. In 1865 he became professor of geology at Harvard. He made numerous contributions to magazines and wrote several books on geology.

Whitney, Mount, the highest peak in the United States proper, rises from the Sierra Nevada Range in eastern California in latitude 36° 35′ N. and longitude 113° 17′ W. It is opposite Owen's Lake, and rises 11,000 feet above the valley floor, the height above sea level being 14,502. It was named for Josiah D. Whitney, state geologist of California.

Whitney, William C. (1841-1904), an American politician and business man. He was a native of Conway, Massachusetts, a graduate of Yale and the Harvard Law School. He practiced law in New York City. He fought the Tweed Ring and supported Grover Cleveland's campaign for the governorship in 1882. Under Cleveland he was secretary of the navy, 1884-8. In this capacity he urged the building of large battleships. He was one of the organizers and promoters of the Metropolitan Street Railway of New York in which competing street-car lines were merged. He was a large landholder and had a number of residences in various states as well as a home in London. He owned a game preserve of 16,000 acres in the Adirondack region. He bore the expense of extensive explorations in Wyoming and other parts of the West in the search for remains of prehistoric horses. He was an enthusiastic yachtsman. He was a keen horseman, an advocate of fair sport and of a more refined atmosphere around the stable and the race track. He was a man of integrity, ability, patriotism, sportsmanship, and wealth.

Whitney, William Dwight (1827-1894), an American student of languages. He was born at Northampton, Massachusetts. He was graduated at Williams College in 1845. He studied at the German universities of Berlin and Tübingen. In 1854 he became professor of Sanskrit at Yale. Professor Whitney was one of the first Americans to be recognized by the university doctors of Germany as a specialist—a scholar in their sense of the word. He wrote several high school texts, including grammars of the French, German, and English languages. His reputation rests on his work in Sanskrit. He published a Sanskrit grammar and contributed to a monumental Sanskrit dictionary published in Germany. He compiled also a German dictionary for college use and acted as editor-in-chief of the *Century Dictionary of the English Language.* See SANSKRIT; DICTIONARY; YALE.

Whittier, John Greenleaf (1807-1892), an American poet. He was born December 17, 1807, in a farmhouse three miles from Haverhill, Massachusetts. His parents were Quakers. His father was of Huguenot descent. Thomas Whittier, the fourth ancestor, the original Whittier of the Colonies, settled in Haverhill about 1640. He brought the first hive of bees to the parish. He was a friend of George Fox. He was a man of gigantic stature and weighed 300 pounds. He was noted not only for the heaviness of his hand but for the justice of his dealings. He made friends with the Indians far and wide. When they descended upon Haverhill and carried away Hannah Dustin, they left the Whittier homestead unmolested.

The future poet was named for his father, John, and for the family of his father's mother, Sarah Greenleaf. Whittier, as well as Daniel Webster, had a fine, dark, expressive eye, doubtless of Huguenot origin. They traced this feature to a common ancestor. Higginson describes Whittier at thirty-five as "a tall, slender man with olive complexion, black hair, straight black eyebrows, and brilliant eyes."

The Whittier farmhouse stood in a position from which no neighbors could be seen. The location within sound of ocean's roar, the secluded farm, the barn, the well sweep, the house, the fireplace, the home circle, the books, games, and pastimes, the cider, nuts, and tales, the snowdrifts and blockaded roads, the ox teams and the old doctor on his rounds, are described in *Snow-*

bound with fidelity. Even the old house-dog is not omitted. Whittier tells us elsewhere how his uncle, "innocent of books," taught him to fish, and how, on one occasion, when fishing, he rejoiced too soon, before he had landed his pickerel. *Barefoot Boy* is without doubt a reminiscence of Whittier's own childhood. The first school he attended was kept by a queer old pedagogue in a room of his own house:

> Through the cracked and crazy wall
> Came the cradle-rock and squall,
> And the goodman's voice at strife
> With his shrill and tipsy wife,
> Luring us by stories old,
> With a comic unction told,
> More than by the eloquence
> Of terse birchen arguments.

Still another glimpse of his boyhood is given in *School Days.* Little money was going in the Whittier household. Farm work six days in the week and a ride over the hills to Quaker meeting at Amesbury on the seventh was the customary weekly round. Books were scarce. The Bible he read and reread until he knew the Bible stories by heart. A teacher placed a volume of Burns in his hands. On his first visit to Boston he bought a copy of Shakespeare. He read one or two of the Waverley novels without the knowledge of his parents.

Whittier attended a few terms of district school. Under the influence of Burns' poems, he was in the habit of scribbling rhymes on a slate and passing them around to the great amusement of his schoolmates. In his way he was fond of fun. He was a great hand to tease his mother and the cat. By binding boots and teaching he managed to pay for two terms at Haverhill Academy. At nineteen a poem sent to the Newburyport *Free Press* attracted the attention of its editor, William Lloyd Garrison. This poem, *The Exile's Departure,* is not given usually in the single-volume editions of Whittier's poems. Garrison drove out to the Whittier homestead to hunt up a youth of so much promise. The acquaintance thus begun ripened into a lifelong friendship.

Few realize that Whittier got his start in life and practice in writing as a country editor. In 1830 he conducted the *Haverhill Gazette.* He was for two years editor of the *New England Review,* founded by G. D. Prentiss at Hartford, Connecticut. In 1838-40 he edited an anti-slavery paper, the *Pennsylvania Freeman,* at Philadelphia. His office was sacked and burned by a mob. Four years later he undertook the management of the *Middlesex Standard* in Lowell. He was for years a corresponding editor of the *National Era* at Washington, D. C. He also was a contributor from time to time to the columns of the *Atlantic Monthly.* During his editorial experience in Massachusetts Whittier was also a local politician with a strong ambition to enter Congress. He was a Whig in politics, a supporter of Daniel Webster and Henry Clay. For years no measure of importance was undertaken by the Massachusetts Whigs without his coöperation. He sat in the Massachusetts legislature and was considered a political leader of integrity and no little shrewdness. Becoming interested, however, in the anti-slavery movement, Whittier resigned all idea of political preferment and devoted himself to the anti-slavery cause. He attended meetings, encouraged speakers, wrote poems, and for twenty years was one of the foremost abolitionists in the United States. He was influential in the formation of the Republican party. His anguish over the defection of Daniel Webster from the cause of freedom is expressed in *Ichabod.*

Whittier supported John P. Fremont and Abraham Lincoln for the presidency. He was opposed to war as a means of setting the slave free, but, seeing that war was inevitable, he supported the cause of the North ardently. He urged his Quaker friends to contribute their assistance by engaging in hospital service.

In 1836 Whittier sold the old Haverhill farm for $3,000 and paid $1,200 for a house in Amesbury adjoining the Quaker church. He enlarged the cottage by successive additions and planted fruit trees. Although Amesbury became a busy manufacturing town, the vicinity has never ceased to be attractive. "Woodsy, and wild, and lonesome," Whittier called it. Here he settled down with his sister as housekeeper. He was never married. The romance of his life, if any, must be inferred from passages in *The Last Eve of Summer, Memories, A Sea Dream,* and other poems. He

was too shy to give friends his full confidence.

At the close of the Civil War Whittier entered upon the peaceful part of his life and wrote the greater part of his best poetry. He worked in what he called his "garden room." He felt that the terms library and study were too pretentious, and, indeed, the word library would hardly have been appropriate, for he had so many books that they overran the whole house. Whittier contributed his poems to many newspapers and periodicals. A number were written for anniversaries, banquets, and other public meetings. Some of the little volumes which were published from time to time before a complete edition of his works appeared were *Legends of New England,* 1831; *Voices of Freedom,* 1846; *Songs of Labor,* 1850; *In War Time,* 1863; *Snowbound,* 1866; *Tent on the Beach,* 1867; *Among the Hills,* 1869; *Hazel Blossoms,* 1875; and *The Sundown,* 1892. Whittier's life at Amesbury was calm, and, we may believe, happy. He wrote, corresponded, received visitors, and indulged in making numerous gifts. His writings brought him in an income quite sufficient for all his wants. His royalty on the first edition of *Snowbound* was $10,000.

His seventieth birthday was marked by an outpouring of tribute in verse and prose from literary people. The publishers of the *Atlantic* gave a dinner in his honor. Emerson and Longfellow sat at his right; Holmes, Howells, and Warner at his left. Fifty other guests of literary note sat about the table. Speeches were made by Howells, Warner, Higginson, and others. Emerson read Whittier's *Ichabod.* Oliver Wendell Holmes read the poem in which he speaks of Whittier as "The woodthrush of Essex," and Whittier begged his friend Longfellow to read for him a few lines, which he termed his *Response.* His eightieth birthday was celebrated by an excursion party coming from Boston by special train.

Whittier was fond of traveling in a quiet way, of camping, and of entertaining friends. He continued to the last to write with a steel pen costing a penny. He dipped it into a five-cent bottle of ink bought from the village stationer. His correspondence became very heavy. He was very patient in answering questions as to the meaning of his poems. He sent his autograph freely to those who asked it. The story is told of his rising from bed to write his name in the autograph books of a party of students from an academy. He was generous in his contributions for philanthropic purposes.

In his later years he became quite feeble. He died September 7, 1892. The funeral exercises were held in his garden. Seats were provided for several hundred. The lads of the neighborhood, many a barefoot boy among them, climbed into the trees; the sweet-voiced Hutchinsons, old and staunch friends, sang; Edmund Clarence Stedman spoke the words of farewell. Whittier's remains were laid at rest in the old family burying ground at Amesbury in which the family circle of *Snowbound* was now reunited.

Critics rank Whittier below Longfellow and Lowell; the people rank him as the Burns of New England. His poems are quoted by school children and in the pulpit and on the platform everywhere. Of all men of letters he is held in deepest affection from the place of his birth westward. When his anti-slavery poems — cries of agony for the oppressed, but without hatred for the oppressor—have in a measure passed out of mind with the occasion of their birth, Whittier will be recognized as the first of New England poets, the poet of the farm and the shop—the poet of the people.

Soon after Whittier's death the old farmhouse where he was born was purchased and placed in the hands of a board of trustees selected by the Whittier Club of Haverhill. The farm and home have been restored as nearly as possible to their original condition. An electric railway runs through the old lane. The scene of *Snowbound* is visited by thousands of literary pilgrims. His Amesbury home is kept substantially as he left it. The garden room in which he used to receive his friends and guests still retains his books and pictures. The chair in which he sat and the desk on which he wrote *Snowbound* are preserved here.

See WEBSTER; ABOLITIONIST; FRÉMONT.

Whittington, Richard (1359-1423), a London merchant and magistrate. He

made a fortune selling cloth. He was a man of liberality, character, influence, and popularity. He held the offices of alderman and sheriff, the latter a position corresponding to our municipal judge. He was elected mayor at three separate elections. In 1422, so run the records, "Whittington, the late mayor," was instrumental in breaking up an ale trust.

Whooping Cough, an infectious disease characterized by spells of coughing and long drawn breaths producing a peculiar "whoop" from which the disease is named. It appears to have been prevalent among the children of Greece. It is due in all probability to a specific bacterium that breeds in the system. Whooping cough appears to be a disease of children whom it attacks at all ages, but chiefly between the cutting of the first and the second teeth. It ranks with scarlet fever and measles as one of the plagues of childhood. Doctors are able to make the disease easy, but seem to have no way of cutting it short. It seems determined to run from four to six weeks. Deaths from whooping cough are slightly in excess of deaths from measles and scarlet fever. There were a great many registered deaths from whooping cough in the United States during recent years. See DISEASE.

Whortleberry, hwûr′t'l-bĕrry. See BLUEBERRY.

Wichita, the county seat of Sedgwick County and the metropolis of southern Kansas. Located in the midst of a rich agricultural region, it has become a leading market and distributing center. Grain, alfalfa, cattle, and lumber are marketed there; also broom corn in immense quantities. Flour, brooms, automobiles, and lumber products are manufactured, while in addition it is the distributing point for groceries, drygoods, hardware, and machinery over a large area. The city has many miles of paved streets, a number of fine parks, and. many costly buildings. Among the latter are the Forum, the Federal Building, the county courthouse, the Masonic Temple, the city hall, and the Y. M. C. A. building. The city prides itself upon two ten-story office buildings and two daily papers. There are, in addition to the public schools, classical colleges, academies, business colleges, orphan asylums, and hospitals. In 1920 the population was 72,128.

Wichita Falls, Tex., the county seat of Wichita County, is a manufacturing city situated in a rich petroleum field. It is on the Wichita River and on the Missouri, Kansas & Texas, Fort Worth & Denver, Wichita Falls & Northwestern and Wichita Valley railroads, 114 miles northwest of Fort Worth. Petroleum refining and the manufacture of sheet and blown glass, flour, motor trucks, stoves, pottery, flour, brooms and oil well machinery and supplies are the leading industries.

The city and county buildings, graded and high schools, a junior college costing $700,000, and a library, are the most attractive features. An immense irrigation project costing $4,000,000 is (1923) nearly completed. The growth of this city is typical of that of centers of petroleum production; in 1910 the population was 8,200, while in 1920 it was 40,079.

Widgeon, a genus of waterfowl closely allied to the teal. Although the term is applied carelessly to almost any wild duck but the mallard, it belongs properly to a single genus. If one is trying to locate the common American widgeon definitely by consulting a manual, it is well to remember that the scientific name is *Mareca Americana.* This widgeon is about twenty inches long with a wing spread of thirty-five inches. The bill is blue, with black at the base and tip. The head and neck are grayish, spotted with black. A green patch surrounds the eye. The top of the head is nearly white, giving the bird the name of "bald pate." The upper parts are spotted and pointed with black. The under parts are mostly white. The wing is white, tipped with black. The speculum is green. The widgeon breeds in Canada and winters in Central America. The sportsmen find it a hard bird to take. It comes down the wind cutting the air with a noise that gains for it the name of whistler. The habits of the widgeon are much like those of the canvasback, with which and the teals it customarily associates. Its food consists of such insects, seeds, roots, and worms as may be found by feeding in the water.

The European widgeon is somewhat

smaller. It is seen at times on the Atlantic coast of the United States and is not unknown on the Pacific. The head and neck of the European widgeon are of a reddish brown.

Widow Bedott Papers, The, a series of humorous papers published by Mrs. Frances M. Whitcher under the name of Widow Bedott or Priscilla P. Bedott in 1847, and in book form in 1855. They first appeared in a Philadelphia paper, Neal's *Saturday Gazette*. They were very popular. Widow Bedott's sayings are still quoted.

Wiggin, Kate Douglas. See RIGGS, KATE DOUGLAS WIGGIN.

Wigglers. See MOSQUITO.

Wight, wīt, an island in the English channel off the south coast of England. It has an area of about 146 square miles. The greater part of the interior is devoted to sheep pastures. The southern coast is noted for a mild, agreeable climate. There are several health resorts. Osborne, near the port of Cowes, was a favorite residence of Queen Victoria. At her death the grounds were presented to the public by her son King Edward VII. Among the antiquities of the island is Carisbrooke Castle, at one time the refuge of the Stuart king, Charles I. Tennyson had a home in the Isle of Wight. See ENGLAND.

Wigwam, an Indian name for tent. The typical Indian wigwam consists of a frame and a covering. The frame is composed of poles, the butts of which are set in the circumference of a circle, while the small ends are brought together at the top like a cone. Ordinarily the covering was made of the skins of deer or buffalo laced together to form a semicircle not unlike a lady's cape in shape. When placed in position this covering surrounded the poles entirely. One was left loose ordinarily for a flap which might be tied down when the family were all within. The fire was built usually in the middle of the tent. A space at the top was left open for the escape of smoke. This space was sheltered by a short curtain erected on the windy side of the vent. The smoke curtain prevented the wind from blowing down the vent and aided in giving proper draught. The squaw built the family bed of skins on the ground or at best on the tips of brush. At best the wigwam was a draughty, uncomfortable dwelling, its only merit being the ease with which cover and tent could be packed up and transported from one camping place to another.

Wilberforce, William (1759-1833), an English anti-slavery leader. He was a native of Hull, Yorkshire, and was educated at Cambridge. In 1780 he was sent to Parliament by his native town. He became interested in the problem of suppressing slavery in the British colonies, Jamaica, and elsewhere. Each year he brought the matter before Parliament. In 1807 a bill was passed forbidding the further introduction of slaves from Africa. This put an end to the British slave trade. Wilberforce lived to see slavery forbidden in every part of the world owning allegiance to the British flag. He was buried in Westminster Abbey. Wilberforce University at Xenia, Ohio, an institution for the education of colored people, was named in his honor. Two of his sons were clergymen of the Church of England. Samuel, a third son, rose to be Bishop of Winchester, a dignity which entitled him to a seat in the House of Lords. A readiness in debate and a plausible manner gained him the popular name of "Soapy Sam." See SLAVERY.

Wilcox, Ella Wheeler (1855-1919), an American poet. She was born at Johnstown Centre, Wisconsin, and educated at the university of that state. In 1884 she married Mr. Robert Wilcox of Meriden, Connecticut. She has contributed many poems and articles to newspapers and magazines. Some of her works are *Maurine, Poems of Passion, Poems of Pleasure, Poems of Power;* the novel *Mal Moulèe, Men, Women, and Emotions, A Double Life, The Beautiful Land of Nod, A Woman of the World, Poems of Sentiment,* and *The Love Sonnets of Abelard and Heloise.*

Wildcat. See LYNX.

Wiley, Harvey Washington (1844-), chief of the United States Bureau of Chemistry, from 1883 to 1912 and noted for the Pure Food and Drugs Act of 1906. Dr. Wiley was born on a little farm near Kent, Indiana. His father "plowed for a living and preached for love," but was an unusually fine Greek scholar, and taught his boy

Greek almost before the boy could talk English. Young Wiley wanted an education so badly that he was willing to get it in this wise: every week he walked in to Hanover College with the week's food supply on his back and fifty cents in his pocket. The money went for a room; and he lived on cornmeal mush, boiled potatoes, bread, and sorghum molasses for four years. An overcoat was a possession not even to be thought of. In spite of such odds against him, he led his class in both scholarship and athletics; he was considered one of the best Latin and Greek scholars that had ever attended Hanover. Then he wished to become a physician, and by tutoring put himself through the medical course at Butler College, and saved enough for a special course in chemistry at Harvard. There Agassiz was one of his teachers. After leaving Harvard in 1873, he taught in Butler College and then in Purdue University, saving enough to go to Europe, where he studied under German scientists. On his return Dr. Wiley was made state chemist of Indiana, from which position he was called to Washington in 1883 as head of the Division of Chemistry. Through his efforts it has been organized since into a bureau in the Department of Agriculture. Dr. Wiley set quietly to work to combat the "universal misbranding, the universal exaggeration of qualities, and the almost universal adulteration of food." Many a label was a lie. "Strawberry jam," for instance, was often composed of glucose, flavoring, coloring matter, and hay seed. In 1902 Dr. Wiley started a series of experiments with his famous "poison squad": a dozen young men of the Agricultural Department volunteered to be experimented upon for the public good, and for months at a time ate nothing but the foods on the market adulterated with borax, salicylic acid, benzoic acid, formaldehyde, etc. The results of these investigations did much to educate the public to the value of pure food and the injuriousness of any other kind.

Dr. Wiley has met with much opposition, even to an investigation of his department on charges of mal-administration. Though exonerated, he resigned in 1912; but continues, as a private citizen, the fight which is his lifework.

Wilhelmina, vĭl′hĕl-mē′nȧ (1880-), queen of the Netherlands. She was born at the Hague, the daughter of William III and Emma of Waldeck. She became queen on the death of her father in 1890, her mother acting as regent until Wilhelmina attained her majority. She was crowned at Amsterdam in 1898 and immediately gained the support and affection of her people. She was married to Henry Frederick, Duke of Mecklenburg-Schwerin, in 1901, and two years later her daughter, Juliana Wilhelmina, was born.

Wilkes-Barre, wĭlks′băr-rĭ, in Pennsylvania, the county seat of Luzerne County. It is on the Susquehanna River, ninety-eight miles northwest of Philadelphia. It is in the heart of a great mining region, and since 1808, when the value of anthracite coal as a fuel was first discovered, it has grown to be an important center for mining supplies. Foundries, machine shops, wire-rope works, cutlery works, breweries, and silk and lace mills, represent the chief manufacturing interests. The Harry Hillman Academy, the Wilkes-Barré Institute, the Wilkes-Barré Business College, and two Roman Catholic academies are the educational institutions of the city. It has several charitable institutions, four hospitals, and one library building. It was settled in 1770, was destroyed during Indian massacres in 1778, was later rebuilt, and has grown rapidly within the last half century. The population was 73,833 in 1920.

Wilkes, Charles (1801-1877), an American sailor and scientist. He was born in New York City and died in Washington, D. C. Young Wilkes entered the navy as a midshipman in 1817. He saw service in the Mediterranean and on the Pacific. In 1826 he received an appointment as lieutenant in the navy.

During the years 1838-1842 he commanded an exploring expedition, the first scientific expedition ever fitted out by our national government. The expedition spent five years abroad. Various points on the coast of South America, Samoa, the Fiji Islands, Hawaii, the Antarctic regions, and the west coast of North America were visited. Soundings were taken and a vast amount of scientific material and informa-

tion was collected. Wilkes wrote a narrative of his expedition which appeared in six volumes in 1845. When the Civil War broke out, Wilkes, in command of the San Jacinto, intercepted the British steamer Trent and took off Messrs. Mason and Slidell, Confederate commissioners to the government of England. See TRENT AFFAIR.

Will, a term in psychology implying volition, or choice, and denoting those processes of the mind by means of which it effects a change in its own states. A general classification of the faculties of the mind includes knowing, or intellect, feeling, or emotion, and will. If we understand by mind the instrument which brings about man's adjustment to his environment, we find that in will, or volition, are centered all the activities of control. Consciousness in its entirety, with all its states, becomes will. It is not a distinct faculty opposed to feeling and knowing, but the three are distinct only as aspects of the mind, while concretely they function only in relation to one another. Only rational beings exercise will-power. Volition presupposes a foreseeing of ends and their value, as well as a discrimination of means by which these ends can be recognized. Volition begins in childhood, is then a choice between muscular motions, and is based on considerations of immediate pleasure or pain. Gradually ideas impel the mind to action, ideas gained by mental processes or from the senses, and the motives which govern voluntary acts become more complex. Thus, from immediate and impulsive reäctions of consciousness, are developed the processes known as conscious acts. Will can be developed only through the development of the mind as a whole.

In a fully deliberative act of will, several competing possibilities having arisen, a conscious selection takes place. As the mind matures choice is no longer governed by immediate motives, but heredity, training, and general ideas of duty are called into play. Often, as in the case of the choice of a profession, action does not follow immediately upon choice, but may be delayed probably for years. Attention is a fundamental act of volition. The function of inhibition, which arises with a conflicting perception, is one of the highest functions of the will. Inhibition develops late, and appears as a faculty of the mind that is able to concentrate upon one particular end or object, to the exclusion of extraneous matters in consciousness. The will is cultivated by effort and by proper control of attention. This training should begin in early childhood, for upon proper development of the power of volition depends one's success or failure in life. Stubbornness indicates neither strength nor cultivation of will, for stubbornness suggests action prompted by feeling, rather than by deliberative choice. The freedom of the will has been much discussed. After choice has been made and action has resulted, no one can say whether or not it could have been otherwise. The question is interesting but not one that philosophy has been able to answer. The law of habit holds here as elsewhere, and man's tendency is to will as he has willed, so practically his freedom seems to be in his own hands.

Will, the legal name of the instrument directing the disposal of one's property at death. Wills are as old as the legal codes of the ancient Romans, perhaps older, and have varied considerably from age to age and from country to country within a given period. In its simplest form the will directs, in the plainest possible terms, so as to avoid contest, that the testator's property be given to a person, to persons, to an institution or to institutions, or to persons and institutions. The more the testator parcels his property, the more careful he must be that each parcel is described beyond possibility of confusion. The testator is free, as long as he keeps within the law, to dispose of his property as he chooses.

To avoid error, the testator should have his will drawn on the lines indicated by proper legal authority. The will usually names some person as an executor, and is signed by the testator and not less than two witnesses. A will is revokable at any time, at the option of the testator. It may be revoked by the drawing of another will, by destruction by fire, or by mutilation; if, on the other hand, the will be accidentally destroyed, it holds if its contents can be proved. A modifying addition, called a "codicil," may be appended to the will at the testator's option. In the United States

and Canada the laws governing details of execution vary from state to state and province to province.

Will-'o-the-Wisp. See IGNIS FATUUS.

Willard, Emma Hart (1787-1870), an American educator. She was born at Berlin, Connecticut, February 23, 1787, and died at Troy, New York, April 13, 1870. She was principal of a school for girls in Middlebury, Vermont. In 1809 she married Dr. John Willard. In 1814 she opened a boarding school for girls in her own home. In 1819 she was encouraged by Governor Clinton to remove her school to Waterford, New York. In 1823, being offered a suitable building, she removed to Troy and established the Troy Female Seminary, the name of which in 1892 was changed to the Emma Willard School. Prior to Mrs. Willard's death 15,000 girls had been students in this school. Mr. Willard died in 1825. A few years later she married a Dr. Yates, from whom she soon obtained a divorce, resuming her former name. Mrs. Willard traveled extensively at home and in England, everywhere advocating the higher education of women. To appreciate her work it is necessary to remember that she entered the educational field when it was believed that women had no need of high school or college studies and no intellect to master them. Mrs. Willard and her school were the forerunners of higher education for women. She was the author of several popular school books. One of these was *Willard's Geography,* the text and maps of which were published in separate volumes. Other texts were her *History of the United States* and an *Astronomy for Schools.* She was a woman of no little poetic fancy. She was the author of *Rocked in the Cradle of the Deep.* See STANTON, ELIZABETH CADY; LIVERMORE.

Willard, Frances Elizabeth (1839-1898), an American educator and temperance worker. She was born on a farm near Churchville, New York, September 28, 1839, and died at New York, February 18, 1898. She grew up in Wisconsin. She was graduated at Northwestern Female College at Evanston, Illinois, in 1859. In 1869 she became professor of esthetics in Northwestern University. In 1874 she resigned to become secretary of the Woman's Christian Temperance Union, of which, in 1879, she became president. She traveled extensively and lectured on the evils of intemperance. Later she became convinced that women should have and should exercise the right to vote in order to counterbalance the power of the saloon vote. She took a leading part in the organization of the World's Christian Temperance Union and in 1888 became its president. Miss Willard was a speaker of ability, a woman of untiring energy. She was capable of addressing the largest audiences. In 1892 she visited England and formed a fast friendship with Lady Henry Somerset. It is said that for ten years she spoke on an average 400 times a year.. In addition to platform addresses and official duties, she carried on editorial work and wrote several books. From 1892-8 she was editor-in-chief of the *Union Signal,* the official organ of the temperance movement. Among her books may be mentioned *Nineteen Beautiful Years, Woman and Temperance, A Great Mother,* and *Glimpses of Fifty Years,* which is autobiographical. A marble statue of Miss Willard has been presented to the nation by the state of Illinois. It was unveiled in Statuary Hall in the capitol February 17, 1905. Miss Willard is represented as standing by a reading desk, a lecturer's manuscript in her hand. On the pedestal of the statue is inscribed her plea for suffrage for women:

> Ah! it is women who have given the costliest hostages to fortune. Out into the battle of life they have sent their best beloved, with fearful odds against them. Oh, by the dangers they have dared; by the hours of patient watching over beds where helpless children lay; by the incense of 10,000 prayers wafted from their gentle lips to heaven, I charge you give them power to protect along life's treacherous highway those whom they have so loved.

William I (1028-1087), surnamed the Conqueror, king of England and duke of Normandy. He was born at Falaise, Normandy. His mother was a tanner's daughter; his father, Duke Robert of Normandy. Before setting out on a journey to Palestine Robert made William his heir. Robert died on the return journey. Surrounding nobles attempted to encroach on the young lad's domains, but he proved to be not only a fighting man but a master of statecraft

as well. He repelled the encroachments of his neighbors and brought even the French king to terms. William surrounded himself by an army of reckless adventurers, accounted the most powerful military force of the day. On the death of Edward the Confessor of England Duke William laid claim to the crown and crossed the English Channel with his band. As a matter of fact, William was related through his father to the reigning family of England, but relationship was merely a pretext. He had the military force at his back. England was a goodly land but a few hours distant, and he was determined to possess it. For an account of the conquest and the manner in which William ruled England the reader is referred to articles on HAROLD, HASTINGS, BAYEAUX TAPESTRY, DOOMSDAY BOOK, NEW FOREST, etc.

William III (1650-1702), king of Great Britain and Ireland and stadtholder of Holland. He was born at the Hague and died at Kensington, England. His father was William II, Prince of Orange; his mother was Mary, the daughter of Charles I. He married Mary, the daughter of James II of England. At the age of twenty-two, he was captain-general of the forces of Holland engaged in repelling an invasion by the French. He opened the dikes and flooded the country around Amsterdam, forcing the enemy to retire. He saved Holland from France and came out of the war with a mortal hatred for Louis XIV. Mary, his wife, was the Protestant daughter of James II of England who was a Catholic. A young son was born to James. The Episcopalians and Presbyterians feared that the Catholics might gain control of England. William feared that James might carry Great Britain into an alliance with Louis XIV. An agreement was soon reached between William and the English Protestants. He raised an army of 14,000 men and embarked as if for an attack on France. On the contrary, he sailed for England. His landing at Torbay, November 5, 1688, was followed by the desertion of James' troops, the flight of James to France, the entry of William into London, and the coronation of William and Mary as joint sovereigns. William never gained the affections of his subjects. He managed Parliament by bribing a sufficient number of members. He formed a league of Protestant Europe against Louis XIV. The Queen Anne's War in America was an outlying eddy caused by the general European storm.

Mary died in 1694. William died in consequence of a fall from his horse in 1702. They rest side by side in Westminster Abbey. William and Mary College, the oldest educational institution in Virginia, was named in their honor. They were succeeded by Anne, the last of the Stuarts, the same in whose reign English literature flourished and the talented but unprincipled Marlborough fought the battles of Blenheim and Malplaquet. The government of England by party began during this reign.

See BOYNE; JAMES II; LOUIS XIV; GLENCOE; PARLIAMENT.

William IV (1765-1837), king of Great Britain and Ireland. He was the third son of George III and the younger brother of George IV, whom he succeeded June 26, 1830. While he was not of great importance personally, his reign is signalized by the passing of the First Reform Bill in 1832, the beginning of local government reform, and of factory and poor-law legislation. He was succeeded by his niece, Victoria. See VICTORIA; HANOVER.

William, the Silent (1533-1584), Prince of Orange and Count of Nassau. He was born at the Castle of Dillenburg, in Nassau, forty-one miles northeast of Coblenz, and died at Delft. He was the founder of the Republic of the United Provinces, the Dutch Republic of history. William was educated as a Catholic and served as a page in the court of Charles V. Here he had opportunity to observe the politics of the greatest court in Christendom and to estimate the qualities of his future sovereign, young Philip, a lad six years older than himself. In 1544, when eleven years old, William inherited the principality of Orange and large estates in the Netherlands. In 1555 Charles V, judging the young man aright, appointed him governor of Holland, Zealand, and Utrecht. William rose rapidly in influence. He served Philip, now Philip II, the successor of Charles V, in a war with Henry of France, and was one of the commissioners to negotiate a

peace. In 1559 he succeeded his father as Count of Nassau. About this time, or soon after, William began to resent the arbitrary rule of Philip and to sympathize with the Dutch Protestants. He resigned his offices and retired to the ancestral castle where he was born.

Charles V had ruled the Netherlands with an iron hand. He had set up the inquisition and had suffered unknown thousands, Motley claims 50,000 to 100,000, men, women, and children to be burned, strangled, or buried alive. Philip ruled from a distance. He was as exacting as his father and, withal, had no knack of attaching the Dutch to himself. In 1566 the Dutch nobles formed a league of Protestants and Catholics alike to demand certain reforms. Protestant mobs rose in the cities, and, with hatred bred of persecution, proceeded to sack and desecrate the churches and cathedrals. Philip sent the Duke of Parma with an army of 20,000 Spaniards to set the cities in order. Parma held a court known as the Council of Blood. The guilt of those who had property worth seizing was apparent to the hungry followers of Parma. Wholesale executions and confiscations followed. William, still in Nassau, refused to appear at the council and announced his adhesion to the Protestant cause. In 1568 he placed himself at the head of the Dutch and entered upon the long struggle for Dutch independence. The Spaniards waged unrelenting warfare. The atrocities told of North American Indians are no worse than the butchery of women and children by the Christian soldiers of Spain. Province after province was devastated; city after city was given over to massacre and plunder.

The central figure through it all, far-seeing, of superb courage, fertile in expedient, prompt in action, keeping his own council, determined to free his adopted people from Spanish cruelty, was the former page, now William the Silent, commander of the forces of the Netherlands. Professor West calls him, not inaptly, "the Dutch Washington." In 1574 he tested the stuff the Dutch were made of. Leyden was besieged by a Spanish force. The inhabitants were starving. Ships laden with food lay at anchor on the North Sea fifteen miles away. The Spaniards guarded the approach. William cut the dikes. The sea flowed in over field and village, destroying in an hour the fruit of centuries of toil; but the ships on the devastating sea rode boldly through the city's gates. Leyden was saved and the war for Dutch independence took a favorable turn. In 1581 the seven northern provinces, including Holland, Zealand, Utrecht, and Friesland, formally declared their independence and made William hereditary stadtholder. July 10, 1584, he was stabbed by a fanatic wretch not worth naming save that he acted at the instigation of Philip II.

William I (1797-1888), king of Prussia and emperor of Germany. He was born at Berlin, March 22, 1797, and died there March 9, 1888. He is the Kaiser Wilhelm of the Franco-Prussian War. He inherited the kingdom of Prussia in 1861. His father was Frederick William III. His mother was the celebrated Queen Louise who withstood Napoleon in so spirited a fashion. William surrounded himself with able advisers, no less than Bismarck as prime minister, Von Roon as minister of war, and Moltke as field marshal. They stood together for a lifetime. They drove Austria out of the German confederation, defeated France in the war of 1870-1, and created the German Empire. King William was crowned emperor at Versailles January 18, 1871. At his death he was laid at rest with his father and mother in the royal mausoleum at Charlottenberg. He was succeeded by his son Frederick who reigned but a few months. The present emperor, William II, is a grandson.

William II [Friedrich Wilhelm Victor Albert] (1859-), ex-emperor of Germany and ex-king of Prussia, was born at Berlin, the son of Emperor Frederick III. Entering the gymnasium at Cassel in 1873, he studied there until 1876, after which he attended the University of Bonn, specializing in law and political science. On the death of his father in 1888 he succeeded to the throne as William II, or Kaiser William II.

He at once displayed the traits of his character that were maturing during the twenty-nine years preceding his accession—inordinate ambition, jealousy of his char-

cellors, deep religiousness and a love of speech making.

Shortly after William's coronation he asserted his "divine right" to rule as he wished. Bismark, who had very materially aided in making the German Empire what it was, held the post of chancellor and held a large place in the hearts of his countrymen. Friction soon developed between William and Bismark, and the latter's resignation was demanded. No more significant fact can be adduced as to Wiliam's high-handedness than that from Bismark's dismissal in 1890 to the time of the emperor's abdication Germany had six chancellors.

Under William, Germany was transformed from a country largely agricultural to one of the first industrial states of the world, making great strides forward in all the material sciences. In a way, this is the key to the whole situation preceding 1914—material advance at the expense of spiritual growth, with the ruler in the vanguard.

One of his chief aims was colonial expansion. German Southwest Africa, islands in the Pacific, concessions in China—these were the prizes he secured, though he was foiled by the United States in his attempt to purchase the Danish West Indies.

To guard these possessions and, if possible, gain more, the emperor organized and built, in the short space of twenty years, a navy second only to Great Britain's. On land, there was gradually hammered into shape one of the most potent fighting machines the world had ever seen—the German army. This on the side that the world could see. On the other, the secret, side, William was making such treaties and alliances as he could to further his ends. In these affairs he was aided and abetted by a powerful, autocratic military caste.

In 1905 William signed with the incompetent Czar Nicholas of Russia a treaty of alliance, the document binding Russia to assist Germany in case the latter went to war. Russia at this time was bound by treaty to France, and all the diplomacy of Germany's foreign agents was called into service to secure the abandonment of the Russo-German treaty.

After the declaration of war the background against which William had performed in peace times—ostentatious visits, speech making on any and every occasion, extravagant professions of piety and good faith and a certain military dandyism in personal attire—gradually lost value and disintegrated.

As soon as the war opened William's troubles at home began. Under him were men who were infinitely his superiors in intellectual attainments and in military ability, but with these he was too often in conflict to hope for sucess in his venture. The Socialists—for the most part out of sympathy with the war from the first—were adding to the political turmoil by calling for peace. As the war progressed, the political situation became worse, until finally William's friends and aids began to urge his abdication. Rioting, revolt of the naval forces and the gradual breaking down of the army's morale added to the gravity of the situation. William was at Spa in early November, 1918. Retreating but angered troops were approaching the city, and on November 10 the emperor, with a small group of retainers, fled by motor to Holland.

At Amerongen, Holland, William signed a formal abdication on November 28, 1918. After June, 1920, he occupied Doorn Castle, situated near the main highway between Arnheim and Utrecht. The German verdict on William is that by temperament and training he was unequal to the task of guiding a great nation in war or in peace.

William and Mary College, the oldest institution of higher learning in Virginia. In age it is the second in the United States, being exceeded by Harvard only. It was chartered in 1693. It was located at Williamsburg on the James River. Certain lands were set aside and a college duty of a penny a pound was placed on the export of tobacco. It was thoroughly Episcopalian. A representative of the Bishop of London was the president. Down to the Revolution it was the richest and most fashionable college in the country; but during the war a large part of the endowment was lost and the college was closed temporarily. The legislature of Virginia, however, made the loss good.

During the Civil War a majority of the students enlisted in the Confederate army.

The college was occupied by Federal troops and most of the buildings were destroyed. The college was reopened in 1869, but was in hard straits. Virginia was crippled financially. The college was suspended from 1882 to 1888, when the legislature came to the rescue with an appropriation of $15,000 a year. In 1893 Congress appropriated $64,000 in payment for buildings destroyed.

In colonial times commencement week drew the First Families of Virginia, the F. F. V.'s from far and near. The planter, his wife, and young people came in their heavy carriages or by boats from the Potomac region. All joined in a week of intellectual pleasure and social gaiety.

Presidents Jefferson, Monroe, Harrison, and Tyler were graduates, as were Chief Justice Marshall, Edmund Randolph, and many other scarcely less noted public men. Phi Beta Kappa, the honorary college fraternity was established here. There are about one thousand two hundred students, and forty instructors.

Williams, Roger (1607-1684), the founder of Rhode Island. He was born in Wales and died at Providence, Rhode Island. His father is said to have been a London tailor. While a lad Roger attracted the attention of Sir Edward Coke, an eminent judge, who educated him at the Charter House School and at Cambridge. Williams was designed for the Church of England, but he became an out and out Puritan. In 1630 he migrated to New England to enjoy religious liberty. He had no sooner landed than he found himself in conflict with the Puritan authorities of Boston, asserting that they were as arbitrary as the authorities of England. He affiliated, however, with the churches of Salem and Plymouth, acting as teacher in the latter for two years. In 1635 the general court of Massachusetts arrested and tried him on charges. The most important of these was that he taught that the civil power, that is to say the government, has no authority to say what a man shall or shall not believe. William's contention was simply for liberty of conscience, a principle now so well understood that it is not questioned in a civilized country, but he was ahead of his time. Men who had come across the Atlantic to found a church according to their own ideas could not tolerate the presence of one who did not in all respects agree with them. Williams was banished from Massachusetts Bay. He fled from Salem to the Narragansett Indians to escape arrest. They welcomed him and gave him a home which he called Providence in a spirit of thankfulness for "God's merciful Providence to him in his distress."

In 1643 Williams went to England and in the following year he returned with a charter, rendering the "Providence Plantations" independent of their uncertain neighbors, the New England Confederacy of Puritan colonies. Mindful of the persecution he had suffered, "Williams," says Oscar S. Straus, his biographer, "was the first to organize and build up a political community with absolute religious liberty as its chief cornerstone. To him, the successful pioneer of these principles, is due to a larger extent than to any other man the American system of a free church in a free state." See RHODE ISLAND; HUTCHINSON, ANNE; PROVIDENCE; BAPTISTS.

Williamsport, Pa., a manufacturing city and the county seat of Lyconing County, is on the west branch of the Susquehanna River and on three railroads, 94 miles northwest of Harrisburg. It has a beautiful location in the Alleghany Mountains, excellent hotels, fine scenery, paved roads, and is a popular summer resort.

Williamsport has an extensive trade in lumber and coal, and its manufactures include radiators, boilers, valves, gas and gasoline engines, stacks, tanks, fire bricks, band instruments, silk, rubber goods, leather, shoes, veneered doors, paper boxes, paper novelties, wire rope, sand paper and numerous other commodities. The city contains Dickinson Seminary, high school, graded public, and parish schools, and a library. In 1920 the population was 36,198.

Willimantic, one of the county seats of Windham County, Conn., is one of the chief centers of the American thread making industry. It is situated at the confluence of the Willimantic and Natchaug rivers, 16 miles northwest of Norwich, and is served by the New York, New Haven &

Hartford and Central Vermont railroads. Silk and cotton prints and twills are also extensively manufactured.

Prominent features of the city are a state normal school, state armory, a large high school, the free public and Dunham Hall libraries and the city and county buildings. Population in 1920, 12,330.

Willis, Nathaniel Parker (1806-1867), an American poet, humorist, and miscellaneous writer. He was born at Portland, Maine. He was educated at Yale and was engaged soon after to edit two annuals, *The Legendary* and *The Token,* for S. G. Goodrich. Later, he established the *American Monthly Magazine* at Boston. This was later merged in the New York *Mirror* Willis traveled in Europe and Asia Minor writing. He wrote *Pencilings by the Way* during this journey. On returning to the United States he edited successively *The Corsair, The New Mirror, The Evening Mirror,* and *The Home Journal.* Titles of his writings are *Two Ways of Dying for a Husband, Dashes at Life with a Free Pencil,* and *People I Have Met.* Willis was the most prominent American journalist of his time. His humorous writings were much appreciated and his poems were popular. His books are little read at the present time.

Willison, Sir John Stephen (1856-), a Canadian journalist, was born in Huron County, Ontario, and was educated in the public schools. For a time he was parliamentary correspondent of the Toronto *Globe,* and in 1890 secured the position of editor-in-chief of that paper. Under Sir John's direction the *Globe* became one of the leading Liberal papers and a strong advocate of various reforms. In 1902 he was made editor-in-chief of the Toronto *News,* an Independent Conservative paper. Sir John was the chief promoter of the Canadian Associated Press and after 1908 was Canadian correspondent of the London *Times.* He has always been a reform advocate and in 1914-16 was chairman of the Ontario Commission on Unemployment, and chairman of the Ontario Housing Commission in 1918-19. Sir John writes the monthly "News of the World" for the *Canadian Magazine.* His contributions are clever, acute and constructive. Among his published works are *The Railway Question in Canada, Lessons From the Old World, Anglo-Saxon Amity, The United States and Canada, The New Canada* and *Remininiscences, Political and Personal.*

Willow, a shrub or tree of both continents. There are about 200 species. The willow is a plant of the north temperate zone, but dwarfs extend far into Arctic regions and are recognized as distinctly alpine plants. Willows have slender, pliant branches, often red or yellow and highly ornamental in wintertime, with long, pointed leaves and flowers of two kinds in separate catkins. In the north these catkins or "pussy" willows are the earliest flowers children gather. They may be hastened, "forced," by placing twigs in bottles of water in a warm room. Willows grow chiefly in moist land along streams or around the margins of lakes and swamps, but are planted often for grateful shade in dooryards. They are planted on the banks of streams, where the fibrous roots bind the soil and prevent its washing away. Willow twigs are charred for artists' charcoal. Willow charcoal is used in the manufacture of gunpowder. The willow of cemeteries, the emblem of mourning, is the weeping willow of Babylon. The Hebrew poet, referring to the dumbness of captives in a strange land, says: "By the rivers of Babylon we sat down. . . . We hanged our harps upon the willow."

Willows are raised easily from cuttings and are planted on the prairies for windbreaks. Some kinds stand drouth well. Willow baskets are made of peeled twigs, chiefly in Europe, where pollarded willows or basket osiers are raised along the roadsides for the purpose. Every two or three years the branches are all cut off, leaving a bare trunk possibly not over ten feet high. It sends out a large number of new shoots the next spring. In time this gives a trunk of great size with no top. Most trees would die with such treatment, but the willow thrives.

In this country Baltimore, Richmond, and York are centers of the willow industry and of basket making. The United States Department of Agriculture is carrying on experiments at Arlington, seeking to pro-

duce willow shoots that surpass in length, toughness, smoothness, whiteness, and smallness of pith. It is found that the basket willow does best indeed in rich bottom land, but that it is at home amid swamps. The shoots should be cut yearly or else they will not only grow too large, but they will be rendered useless by the appearance of branches the second season.

American willow growèrs cut to the ground, a clean sweep, in midwinter. The shoots are placed on end in four inches of water. When the warm days of spring come the sap starts and the bark is loosened. As fast as the shoots are stripped they are tied in bundles and stored away in the dark to prevent the wood from hardening and becoming brittle.

Botanically, the willow is allied closely to the poplar or aspen. Botanists find it difficult to distinguish the different species of the willow. On examining a catkin it will be found to consist of numerous flowers, each just within, that is to say, above, a bract. The sterile flowers have from two to ten stamens. The number of stamens is of importance in identifications. The fertile flowers consist of a single pod each. The shape of the pod, the length of its neck, etc., are points of importance to the systematic botanist. The bark of all the willows is bitter. The taste is due to a peculiar juice from which white, silky, salicylic crystals are produced. Salicylic powder is almost as bitter as quinine, and is used as a substitute for it in cases of fever. It may be used to preserve foods, and is a remedy also for acute rheumatism. The cone-like growths at the tips of many willow branches are galls caused by the sting of a gall gnat. On opening the cone it will be found to be inhabited by the maggots of the gnat.

Wilmington, the metropolis of Delaware and the county seat of New Castle County, is situated at the confluence of the Delaware River and Brandywine and Christiana creeks, 27 miles southwest of Philadelphia. It is served by the Pennsylvania, Philadelphia & Reading and Baltimore & Ohio railroads.

Description. The city is attractively situated on the hilly land fronting the Delaware and lying between Brandywine and Christiana creeks. Broad paved streets, and abundance of shade trees and numerous parked areas add to its beauty. The largest parks are the Brandywine and Rockford.

Conspicuous among the public and semi-public buildings are the city, county and Federal buildings, Delaware Trust building and the Du Pont building. Notable institutions are, besides the public schools, Wilmington Friends' School, Ursuline Academy, Wilmington Military Academy, Hebb School, Goldey College, commercial colleges, Historical Society, public and Law Library Association libraries, State Hospital for the Insane, Ferris Industrial School for Boys, Delaware Industrial School for Girls, Home for Friendless and Destitute Children, St. Joseph's Home for Colored Children and St. Peter's Orphanage.

Industry and Commerce. Wilmington is the principal industrial city of Delaware, and leather tanning and the making of leather products is the leading industry. There are also numerous manufactories for the production of paper, passenger coaches, iron and steel, ships, foundry and machine shop products and tobacco products. The plants for dyeing, bleaching and finishing cotton goods are among the largest in the United States. Almost two miles from the city is the Du Pont Powder Plant, one of the largest in the world.

History. Wilmington was founded in 1638 by a colony of Swedes under Peter Minuit, and was at first named Christianaham. Later, under the Dutch and the English the name of the settlement was changed several times, the present name having been adopted in 1745. The first city charter was granted in 1832. In 1920 the population was 111,168.

Wilmington, N. C., a seaport, the county seat of New Hanover County and the third city of the state, is on Cape Fear River, 148 miles south by east of Raleigh and 30 miles from the Atlantic Ocean. Transportation by rail is provided by the Seaboard Air Line and Atlantic Coast Line railroads.

Wilmington is the commercial center for a large part of southern North Carolina and northern South Carolina; the river harbor is landlocked and is used by ships of every

nation. Vessels drawing 28 feet of water can safely be docked at the wharves. Cotton, peanuts, rice, naval stores, turpentine and lumber are the chief items of export. The city has manufactories of lumber and lumber products, turpentine, chemicals, metal ware, hosiery, cotton products, fertilizer and foundry and machine shop products.

Attractive features are the city, county and Federal buildings, Kennedy Home for Aged Women, United States Customs House, Masonic Temple, Union Station, James Walker Memorial Hospital, New Hanover High School, various grammar schools, Murchison and Commercial bank buildings, public library and several beaches and parks.

Wilmington was founded in 1730 under the name of New Liverpool, and was incorporated as the town with its present name in 1739; in 1743 it was made the capital of North Carolina Province. The population was 33,272 in 1920.

Wilmot Proviso, in American history, a proposed restriction upon the extension of slavery. August 8, 1846, President Polk sent a special message to Congress requesting an appropriation for "the adjustment of a boundary with Mexico," the purpose being to purchase territory not acquired with Texas. A bill appropriating $2,000,000 was introduced in the House. Daniel Wilmot, a Pennsylvania Democrat, offered an amendment, since known as the "Wilmot Proviso," providing that "neither slavery nor involuntary servitude shall ever exist in any part of said territory except for crime whereof the party shall first be duly convicted." The bill as amended passed the House, but it was stopped in the Senate.

At the next session of Congress, a bill was proposed appropriating $3,000,000. Wilmot offered his amendment a second time, but after an angry debate the bill was passed without the amendment. The object of the proviso was not attained until 1862 when Congress passed an act prohibiting slavery "in any of the territories of the United States now existing or which may at any time hereafter be acquired."

Wilson, Alexander (1766-1813), a Scottish-American ornithologist. He was born in the weaving village of Paisley, Scotland, and died at Philadelphia. His youth and early manhood he spent weaving at the loom, writing poetry, or peddling. One poem published anonymously in 1792 under the title of *Watty and Meg* was ascribed to Burns and had an enormous circulation. Having been so unwise as to attack a fellow citizen in print he was arrested and required to burn the libel with his own hand at Paisley cross. He was a naturalist by inclination and resolved now to migrate to Philadelphia. Here he taught school, roamed the forests, formed the acquaintance of William Bartram, whose gardens are still the delight of Philadelphia, and resolved finally to prepare an account of American birds. *Wilson's Ornithology,* in nine volumes, with beautifully colored plates, was the result of years of ceaseless toil. The first volume appeared in 1808; the last, a year after his death. Sets are now rare and are worth a large sum. After Wilson had become famous Paisley revised its opinion and erected a monument to his memory. A more acceptable tribute is that of the ornithologists who have attached his name to several birds, as Wilson's tern, Wilson's snipe, Wilson's plover, etc.

Wilson, Henry (1812-1875), a prominent American statesman. He was born at Farmington, New Hampshire. His original name was Jeremiah Colbaith, which, however, he changed to Henry Wilson on coming of age. He was educated chiefly on a farm and at the shoemaker's bench. He saved a little money at his trade and attended various academies. He was one of the early founders of the shoe trade at Natick. In 1840 the Whigs sent Wilson to the legislature of Massachusetts. From that time on he was a prominent figure in the politics of his adopted state. He cooperated with John G. Whittier in antislavery work. He was a member of the Free-Soil party, and later was one of the organizers of the Republican party. He held various positions. In 1853 he entered the United States Senate, a position to which he was elected in all four times. In 1872 he was elected vice-president by the Republicans. Although regarded with disfavor in the South, Henry Wilson was

Woodrow Wilson

a man of integrity and determination, a sincere patriot. The most prominent of his writings was a *History of the Rise and Fall of the Slave Power in America.*

Wilson, James (1742-1798), an American statesman and jurist. He was born in Scotland and was educated at the universities of St. Andrews, Glasgow, and Edinburgh. He emigrated to Philadelphia in 1765. For a time he taught in the University of Pennsylvania. He then took up the practice of law. In the stirring times of the Revolution Wilson was a prominent figure. He was a member of the Pennsylvania provincial convention and of the Continental Congress. He was a strong advocate of the Declaration of Independence and was one of the signers of that memorable instrument. He served in the army as well, rising to the grade of brigadier-general. He was a member of the Constitutional Convention of 1787 and was one of the most influential men in that body. It is claimed that in foresight and logical ability he had no superior in the convention. He was influential in securing the adoption of the Constitution by the people of his state. He was a Federalist with unbounded faith in the people. Washington appointed him one of the justices of the new supreme court.

Wilson, James (1835-1920), an American agriculturist, born in Scotland. He came to the United States in 1852. He became a farmer in Iowa in 1861, after studying in Iowa College for some time. He represented Iowa in the state legislature for three terms, being made speaker of the fourteenth assembly, and was a member of Congress during the terms 1872-7 and 1883-5. He was state railway commissioner in 1877-83, regent of the University of Iowa in 1870-4, director of the Iowa Agricultural Experiment Station in 1890-7, and later became professor of agriculture in the Iowa Agricultural College at Ames. He was appointed Secretary of Agriculture by President McKinley in 1904, and was retained by President Roosevelt and President Taft.

Wilson, John (1785-1854), a Scottish man of letters. He was educated at Glasgow and at Oxford. He was a fine scholar and was considered an athlete. A modest inheritance rendered him independent for a time of his profession of the law. Frequent papers in *Blackwood's* over the pen name of Christopher North brought him into notice. He became a professor of moral philosophy in the University of Edinburgh. His most popular work is the *Noctes Ambrosianae,* descriptive extracts from which have found their way into school readers. His magazine articles were collected under the title of *Recreations of Christopher North.* Such subjects as catching a trout, coursing a hare, and the rescue of a child from the eagle's nest he handles admirably. See BLACKWOOD, WILLIAM.

Wilson, Woodrow (1856-), an American historian, college president, and statesman. Mr. Wilson was born in Staunton, Virginia. After graduating from Princeton in 1879 he studied law at the University of Virginia and practiced for a year at Atlanta. Then he undertook special work in history and politics at Johns Hopkins, 1883-85, and after two years' teaching at Bryn Mawr, and two at Wesleyan University, he went to Princeton as professor of politics. In 1902 he became president of that university. All this time he was writing with great power and authority on historical and political subjects. *Congressional Government, A Study in American Politics, The State, Elements of Historical and Practical Politics, Division and Reunion,* and *A History of the American People,* in five volumes, are best known. In 1910 he astonished the Democratic party of New Jersey by resigning the college presidency and accepting the nomination for governor. He was elected by the people of the state on his declaration that he was tied by no promises except those made to them—that if elected he would try to do the will of the people. During his term he secured the passage of a primary election law, much needed in the state.

In 1912, he was nominated by the Democratic party for President and elected by an overwhelming majority of the electoral vote. Both branches of Congress had Democratic majorities.

The outstanding events of Wilson's first term were: a "downward" revision of the

tariff; the Federal Reserve Banking law; provision for the Alaskan railroad; completion of the Panama Canal; trouble with Mexico, due to Huerta's insult to the flag, and raids into the United States by Villa bandits (see MEXICO); strained relations with Germany, due to the destruction of ships by German and Austrian submarines.

In 1916 Wilson was renominated by the Democratic party and reelected. Notwithstanding the President's proclamation of neutrality issued at the outbreak of the Great War, and generally approved by the people, relations with Germany had neared the breaking point before the election of 1916, and when late in January, 1917, Germany announced that after February 1st she would resort to unrestricted submarine warfare, diplomatic relations with that country were severed. War was declared against Germany in April, 1917. Though pledging the United States to war with great reluctance, the President firmly announced it as his intention to prosecute it with vigor. To him and his colleagues it was a war to end war, and it could be ended quickly only by throwing into it the full resources of the country. With this end in view Wilson delegated to military men full power to act in military matters, protecting them from the meddling of politicians. General John J. Pershing was made commander-in-chief of the overseas forces, and Wilson did all in his power to centralize army authority in the general staff. He was a staunch proponent of the Lever Act, under which the Food and Fuel Commission was organized, and of the Selective Service Act. Economic affairs were put into the hands of experts—Hoover, Vanderlip, Goethals and others—irrespective of their political affiliations.

As the war progressed, the basis of idealism upon which the President's war aims rested was developed and won favor among all the allies. In several timely speeches he outlined a plan for lasting international amity, stating in the notable speech of January 8, 1918, the "fourteen points" that would have to be followed if a just and lasting peace were to be made. So potent were his words that in 1918 Germany and Austria-Hungary offered to accept the "points" as the basis of the peace for which they were ready. They were not so acceptable to the allies, however; the latter feared that by stressing moral factors Wilson would make all forego the material gains of the war. And at home his political enemies were declaring for a strong peace, a peace that would rob Germany of any power to do harm for years to come and if possible for all time.

The League of Nations (which see) Wilson regarded as absolutely essential to a right and enduring settlement. The League was favored by most of the allies, but was not well regarded at home. In the Peace Council—which Wilson unprecedentedly attended in person—he was forced to accept, in part, the demands of the allies; but his frankness and justness went far to placate the hostility of some of the allies toward Germany. He forced the acceptance of the League as the basis of peace, and was successful in his fight for the approval of the preliminary draft of the covenant.

Following the signing of the Treaty of Versailles Wilson returned to the United States. Owing to his opposition to the nationalism of some of the allies his war time prestige had suffered somewhat. But nothing could detract from his successes at the Peace Council. In America, opponents of the League were many and powerful. In an effort to win popular support of the League Wilson started on a tour of the country. The strain of his war time activities had greatly injured his health, and in September, 1919, he suffered a nervous breakdown and was forced to discontinue the tour. It is believed by many that had Wilson not fallen ill the League might have been accepted by Congress without reservation.

In 1920 Wilson was awarded the Nobel prize for peace. After the close of his administration he engaged in legal practice in Washington, D. C.

Wilt, in agriculture, a fungus that attacks field crops, as cotton, cowpeas, but particularly the growing flax plant. Flax wilt is prevalent the world over, and wherever flax is an important crop is a serious menace to the farmer. The fungus lives on the flax plant, but it persists in the

ground for several years after a crop has been removed. Soil infected with the wilt is said to be flax-sick. The wilt attacks the young flax plant as soon as the seed has sprouted. Many of the plants are killed before they open their leaves; others struggle up to a height of a few inches then take on a sickly yellowish hue and wilt at the top, whence the name. The plants that attain full height before they are attacked dry up and break off at the surface of the ground. The roots of an affected plant have a peculiar dry, ashy look.

Wilt is reproduced by minute spores which cling to the seed of the flax and are carried from field to field. Spraying the seed with a solution of one part formaline to forty parts water will prevent wilt on land that is not already infected. The experiment station of North Dakota has developed a strain of flax which is able to resist the fungus.

Winchell, Alexander (1824-1891), an American geologist, born at Northeast, New York. He was educated at Wesleyan University. In 1853 he was made professor of civil engineering and physics at the University of Michigan, and two years later of botany and geology. From 1859-62 he was state geologist of Michigan, and again from 1869-71, in the meanwhile having taught geology in the University of Kentucky. From 1869-71 he was also director of the Michigan Geological Survey. Then he served three years at Syracuse University, first as chancellor, later as professor of geology. He was recalled to the University of Michigan, where he taught until his death. He is the author of numerous scientific works, and was well known as an entertaining lecturer. Among his books are *The Doctrine of Evolution, Science and Religion,* and *Sparks from a Geologist's Hammer.*

Winchester, the capital city of Hampshire, England. It is situated on a small river eleven miles north of Southampton. The town is interesting chiefly as the capital of the Saxon kingdom from the ninth to the eleventh centuries. The English Parliament used to meet here. Winchester is now a city of 23.378 people. It is noted for its schools, residences, and antiquities. The old castle, the home of Egbert, still stands. The pride of the city is Winchester Cathedral, some parts of which date from the eleventh century. Its length from east to west is 545 feet. The interior contains a number of chapels and altars, and is considered one of the most beautiful specimens of architecture in England. The tombs of William Rufus, William of Wykeham, who planned the work, Izaak Walton, the angler, Cardinal Beaufort, and others are here. Quite recently the old cathedral began to settle into a hitherto unsuspected layer of peat eight feet in thickness. To secure the ancient foundations, the peat was dug out and was replaced by bags of cement that solidified into a solid concrete mass. It is interesting to note that the ancient Winchester bushel is the legal standard in the United States. See BUSHEL.

Wind, a current of air—air in motion. The origin of wind is easily understood. Were all parts of the earth equally heated by the sun's rays, the atmosphere would be uniformly dense and would rotate with the earth. The atmosphere would be in a state of perpetual calm. Under present circumstances, however, the sun heats certain areas of the atmosphere more than it does others. The heated portions of the air expand and swell up, pouring out over the cooler areas. The heavy air of the cool areas is held back no longer by the lighter air of the warm areas and rushes in to restore the equilibrium. Thus winds are formed. A similar illustration may be noted on any warm seacoast. During the daytime, the air on land is heated more than the air over the sea. A cool breeze from the sea sets in early in the day and continues until night. During the night time the air on land cools off more rapidly than the air on the sea and becomes more dense. Soon after nightfall, therefore, a cool breeze from the land sets out toward the sea. Thus, on tropical coasts, the sea breeze of the daytime is followed by a land breeze at night with unfailing regularity. This alternation of cool breezes renders the climate of many coasts delightful.

The great amount of heat received within the tropics creates a system of atmospheric circulation on a grand scale. The

hot air of the torrid zone expands, flows outward, and is unable to balance the cold air of the poles and the temperate zones. This causes two lower currents from the poles to the equator and two upper currents from the torrid zone back to the poles. Owing to the turning of the earth on its axis, the air at the equator has a much greater rotary motion than the air nearer the poles, that is to say, equatorial air is turning eastward with the earth rapidly. As this air travels northward and southward toward the poles it outruns the meridians of longitude, creating upper currents that travel in a northeasterly and southeasterly direction respectively. The lower currents originating in latitudes that have a less rotary, that is to say, a slower easterly, motion than the equator, are outrun by the torrid zone. They fall backward accordingly as they travel northward and southward toward the equator, producing a northeast wind in the northern hemisphere and a southeast wind in the southern hemisphere. These diagonal winds are called trade winds from their influence on commerce. The two belts of trade winds shift northward and southward somewhat according to season, but they blow westerly during the entire year.

Winds are named from the direction from which they come. A north wind is a wind traveling southward. A wind from land is called a land breeze; one from the sea, a sea breeze; a wind coming from the northeast is called a northeast wind, and so on. In the reports of the United States Signal Service, a fresh wind is a wind blowing twelve miles an hour; a high wind has a rate of thirty-five miles an hour; a gale, forty-five miles; a hurricane, ninety miles.

The highest velocity winds have attained since the United States signal stations have been established are as follows: Albany, New York, seventy miles per hour; Alpena, Michigan, seventy-two miles; Bismarck, North Dakota, seventy-four miles; Buffalo, New York, ninety miles; Chicago, Illinois, eighty-four miles; Custer, Montana, seventy-three miles; Denver, Colorado, seventy-five miles; Duluth, Minnesota, seventy-eight miles; El Paso, Texas, seventy-eight miles; Galveston, Texas, eighty-four miles; Memphis, Tennessee, seventy-five miles; North Platte, Nebraska, ninety-six miles; St. Louis, Missouri, eighty miles; Washington, District of Columbia, sixty-eight miles.

From the tables compiled by the United States Weather Bureau the wind pressure per square foot is as follows, according to the velocity of the wind per hour:

10 miles.....	.37 lb.	60 miles.....	9.22 lb.
20 miles.....	1.27 lb.	70 miles.....	12.05 lb.
30 miles.....	2.64 lb.	80 miles.....	15.50 lb.
40 miles.....	4.44 lb.	90 miles.....	19.20 lb.
50 miles.....	6.66 lb.		

See WHIRLWIND; CYCLONE; HURRICANE; MONSOON; CHINOOK; SIROCCO; FOEHN; SAIL.

Windmills, mills driven by a current of air. They are used usually to grind grain, pump water, saw wood, and to perform other useful work. Aside from the fact that the Crusaders found windmills in use among the Saracens and brought back a knowledge of their use to Europe, authorities know little about their origin.

Small windmills are common in Germany and Holland. They are seen less frequently in France. They have disappeared almost entirely from England, their place being taken in the latter country by water and steam mills. In Europe the sail wheel is composed of two large beams crossing each other at right angles. Each of the four arms carries a framework on which a large cloth sail is stretched. In time of high wind or storm these sails are furled or rolled up. This wheel, as it may be called, faces the wind squarely. The sails are set on a slant, so that the wind in forcing its way past them pushes them aside, causing the wheel to rotate and turn an axle by means of which power is transferred to the millstones or other mechanism designed to do work.

A small windmill is to be seen near every German village. It stands, that is to say, it is balanced, on a wooden pivot. When the wind changes, the peasant proprietor clatters down a hanging stairway to the ground, taking care not to lose his wooden shoes, and, seizing a long wooden sweep, turns the entire mill around until the sails look squarely into the wind again. When the wind stops altogether the miller joins his wife in the field.

The Dutch windmill, so useful in pumping water out of the sunken areas, is constructed on a somewhat different plan. The top of the mill, to which the axle and the sails are attached, consists of a movable cap or turret. When the wind changes the proprietor puts his shoulder against the lower end of a sail beam and walks around on a sort of platform, pushing the sails before him until they face the desired direction. The people of Holland depend on the windmill to grind grain, saw wood, clean flax, grind paper pulp, and drain land. The Scandinavian windmill follows the Dutch type. Settlers have introduced both types throughout the North American states and provinces.

The farm windmill in common use in America is erected on slender trestle work of wood or iron. The entire face of the sail-wheel is occupied by light slats, so that the same amount of surface is presented to the wind with a comparatively small diameter. A tail constructed after the fashion of a weather vane keeps the wheel fronting the wind. The slats composing the wheel are set usually on pivots in such a way that a tornado turns them edge to the wind and saves the tower from being overthrown. It is estimated that there are half a million farm windmills, used chiefly for pumping water, in the United States alone. According to the last United States census there are sixty-eight manufactories of windmills. The number of mills made is not given, but their annual value is over $4,000,000.

One of the largest windmills ever built stood for many years near Seal Rock, San Francisco. It was used for pumping water for the irrigation of Golden Gate Park. But the improvement of San Francisco's water supply system rendered this mill worthless, and it was dismantled. See STEAM; WATERPOWER.

Windom, William (1827 - 1891), an American financier and politician. He was born in Waterford, Ohio, was admitted to the bar in 1850, practiced in Mount Vernon, Ohio, for a time, moved to Minnesota and represented that state in the United States House of Representatives for five successive terms (1859-1869). He also served as United States senator, and in 1881 he was appointed Secretary of the Treasury by President Garfield and remained in that office until the president's death, when he returned to the senate to serve his unexpired term. President Harrison appointed him Secretary of the Treasury again in 1889, which position he occupied until his death.

Window, an opening in the wall of a building to let in light and air. The word appears to be of Scandinavian origin, meaning literally, "wind eye." The window is an important element in architecture. It was little used by the Greeks. Light was introduced by them usually into a court through a large opening in the roof. The outer wall, surrounded usually by a colonnade or row of columns, was unbroken by windows or other apertures for light. The Romans derived their earlier ideas of architecture from the Greeks and made little use of windows. The window is a principal feature in Gothic architecture. A window of stained glass in the eastern end of York Cathedral is seventy-five feet high and thirty-two feet in width. Although glass was known to the Phoenicians, it did not come into general use in windows until the eleventh century. Owing to the expense of glass, the windows of the Saxons and early English were left open, or else were closed with oiled paper. Glass windows were regarded as a luxury to be afforded only by the rich. The veriest peasant has better windows than were known to the occupant of the castle prior to the Norman conquest. A favorite form of tax in England was a tax on windows. Householders paid taxes according to the number of windows in their homes. Later the window tax was imposed on all windows above the number of six. This form of taxation was not abolished until 1851. See GLASS.

Windsor, Nova Scotia, the county town of Hants County, is situated at the junction of the Avon and Saint Croix rivers and on the Dominion Atlantic and Midland railroads, 46 miles northwest of Halifax. The Avon River empties into the Basin of Minas and is navigable to Windsor, so that the city is a port of entry. Hard and soft gypsum, found in abundance in the vicinity, is the chief article of trade. The city has

manufactories of glue, fertilizer, underwear, lumber, rattan chairs and other furniture, dried apples, plaster, lime and machine shop and foundry products. Gold, antimony and manganese are mined near the city.

Windsor is the seat of one of the oldest institutions of higher learning in the Dominion—King's College. Other educational institutions are the Church School for Girls, Boys' College School, public primary schools and a library. In 1921 the population of Windsor was 3,591.

Windsor, Ont., the largest of a group of urban centers known as the Border Cities, which comprise the municipalities of Riverside, Ford, Walkerville, Windsor, Sandwich and Ojibway—all of which adjoin—are located at the southern extremity of Canada, across the river and only eight hundred yards from the city of Detroit, Michigan. Their population is now sixty-five thousand, having practically doubled within the past five years.

The Border Cities are essentially industrial; they are Canada's motor vehicle manufacturing center. Some forty-five different plants are engaged in the production of automobiles, trucks, tractors, accessories and parts. The total number of important industries is 206. In addition, there is quite a number of smaller ones, most of which indicate symptoms of rapid growth. The larger industries employ 20.000 workers, and have an annual payroll, conservatively estimated at about $18.000.000. Export business for 1922 amounted to $25,000,000. The development of this export business has solved the problem of winter unemployment.

The Border Cities possess practically every facility essential to the successful conduct of almost all lines of industry, such as cheap power, cheap coal, five trunk railways, and a connecting terminal line; water transportation at low rates to Montreal and to the head of the Great Lakes. In addition, the communities are strictly up-to-date, and notwithstanding their industrial character, most picturesque and scrupulously clean. The other leading manufactures are heavy drugs, chemicals, pharmaceutical products, proprietary medicines, paints and varnishes, distillery and brewery products, scales, adding machines, cereal foods, steel bridges, structural steel, wire fencing, stampings and forgings.

The surrounding district is exceedingly fertile and very beautiful by reason of the long and genial summer season, the only one in Canada producing hard husking Indian corn of the finest quality. Other leading crops are tobacco, onions, tomatoes, melons, etc.

The educational facilities include, extensive public schools, separate schools, high schools and collegiate institute, technical school, English-French Training School, St. Mary's Academy and Assumption College, public libraries and supervised play grounds. The public schools are organized on the rotary plan, which provides a highly efficient academic, social and physical training program. The schools, from the standpoint of organization, equipment and architecture, are thoroughly modern and unsurpassed in the Dominion.

For the past six years, the Border Cities have been by far the most rapidly developing center in all Canada. According to the Dominion census of June, 1921, the population increase for the decade was over 138 per cent—an unapproached record for the period. The population was 38.591 in 1921.

Windsor (wĭn'zor) **Castle,** the usual residence of British monarchs. It is one of the largest and most magnificent royal residences in the world. It is situated on the bank of the Thames, twenty-one miles above London. The site was purchased by William the Conqueror from the monks of Westminster Abbey. He built a castle here. Extensive improvements begun in the reign of George IV were completed in the reign of Queen Victoria at a total cost of four and one-half million dollars. The pile of buildings includes a round tower or keep, battlements, walls, chapels, state apartments, and private apartments. Queen Victoria's private rooms are said to have been fitted up most sumptuously and to have contained the richest collection of china, gold and silver plate, pictures, and hangings to be found in any home in England. The royal stables or mews cost $350.000. The walls of the castle inclose a number

of quadrangles, terraces, and open courts, occupying in all twelve acres. The battlements of the tower, eighty feet in height, command a charming view of Eton and the country around Windsor, embracing in clear weather parts of twelve counties. A bell now hung in the tower was brought from Sebastopol. A great park, 1,800 acres in extent, lies to the south. It is stocked with several thousand fallow deer. The traditional hawthorn shade, the English oak, and the English cuckoo are to be sought here. On the opposite side of the castle lies a smaller park in which Frogmore Lodge is situated. Its grounds contain the tomb of Queen Victoria's mother, and also the magnificent mausoleum in which Victoria and her husband, Prince Albert, repose. Herne's oak, celebrated in Shakespeare's *Merry Wives of Windsor,* stood formerly in this park. In 1863 it was destroyed by lightning. A young oak was planted in its place by Queen Victoria. It is understood that King Edward, toward the close of his reign, turned his attention to beautifying Windsor Park, which, since the death of the prince consort in 1861, had been somewhat neglected.

Wine, the fermented juice of the grape. Freshly gathered grapes are thrown into a vat and pressed, frequently by trampling on them. The juice or must is drawn off and allowed to stand. Fermentation, a process carried on by a yeast plant present in the must, sets in at once. The must "works" for a few days, being stirred up from day to day to reëxcite the fermentation. Sugar is present in all grape juice and is changed by fermentation into alcohol. If the sugar be changed wholly to alcohol we have a "dry" wine free from sweetness. If the wine be bottled before fermentation is complete a "sparkling" wine is produced. As wine ferments sediment is formed, and the wine is drawn off repeatedly until judged ready for bottles or casks.

The same kind of grape produces very different wines in different localities for no known reason. Certain celebrated vineyards of the Rhine a few acres in extent yield wine of superior quality. Wines are supposed to improve with age. The vintages of different years differ. The vintage of 1846 is celebrated. The vintage of 1856 was considered wretched. The red wines and white wines owe their names to the color of the grapes from which they are made. Most wines take their names from the vineyard, district, or town from which they are obtained. "Port" is a shortened form of Portugal; "sherry" is the English for Xeres; "hock" is for Hocheimer, etc.

The amount of alcohol in wine varies according to the kind of wine, but may be placed at from nine to twenty-four per cent in the following order, the last named containing the largest percentage of alcohol: moselle, claret, Rhine wine, burgundy, champagne, sherry, maderia, and port.

The great wine-producing countries of the world surround the Mediterranean. A belt of wine-producing countries in the southern hemisphere includes Peru, Argentina, Cape Colony, and the Australian colonies. American grapes are grown chiefly for table use, but before prohibition the Ohio Valley produced Catawba wine and wine was an important California product.

Germany owes its prominence in the production of wine almost wholly to the valley of the Rhine and its tributaries. Greece grows a smaller grape, for an account of which see CURRANT. The wines of Portugal are celebrated, but the area under vines is necessarily limited. Most of the wine is of a cheap quality, and is made for home use. The better grades are shipped in bottles or casks to all parts of the world. Some idea of the enormous commerce in wines may be formed from the importation of London alone, which amounts to millions of gallons a year. See CHAMPAGNE; BURGUNDY; SHERRY; FERMENTATION; CREAM OF TARTAR; GRAPES.

Winnebagoes, a tribe of American Indians. The name is Iroquois, meaning muddy water. When first known by the French they lived about Green Bay, Wisconsin. They were neighbors to the Chippewas. They were an eastern branch of the great Dakota family. They have been pushed from one place to another. A remnant of 2,000 men, women, and children are found on reservations in Nebraska and Wisconsin. They still cling to their former modes of life. See DAKOTAS; CHIPPEWAS.

Winnipeg, Manitoba, the capital of the province and the county town of Selkirk County, is also the third city of the Dominion. The city is situated at the confluence of Red River and the Assiniboine, 60 miles north of the international boundary. It is served by the Canadian Pacific, Great Northern, Canadian Northern, and Grand Trunk railroads. Winnipeg is regularly laid out with broad, paved and well shaded streets; the chief business thoroughfare, Main Street, is the widest in Canada.

Buildings, Parks and Institutions. Winnipeg has grown very rapidly; it is on the main east and west trade routes and is an important railroad center. Because of its rapid growth, few of the important buildings in the city are old. The most conspicuous structures are Parliament House, Masonic Temple, Hudson's Bay Company office building, Ideal Building, Canadian Pacific station, Union Station, Union Bank building, the offices and plant of the *Free Press,* city hall, post office, Royal Alexandra and Winnipeg hotels and the court house.

There are a number of public parks in the city, all well tended and attractive. The most popular, as well as the largest, are River Park, which has a zoological garden, Elm Park, on a peninsula in Red River, and Assiniboine Park.

Winnipeg is the seat of the University of Manitoba and the Provincial Agricultural College. The public graded and high schools occupy attractive buildings and are entirely modern. Other institutions are the deaf and dumb institute, general hospital, Womens' Home and Childrens' Home.

Commerce and Industry. Occupying as it does a position that is commercially strategic, Winnipeg has a wholesale trade that amounts to no less than $250,000,000 annually and will steadily increase. Grain is the most important item, and is followed by live stock, lumber and minerals.

The industrial plants produce structural steel, cabinets, caskets, farm tractors, wire, harness, flour, steam boilers, cement, electrical appliances, clothing, hats, iron ware, jewelry, pulp and paper, cordage, beet sugar, agricultural implements and machinery, hemp fiber, pottery, bricks and tile. tents, boxes and other articles. These products help to swell the volume of trade.

History. The first settlement was made here in 1733, and with the coming of settlers into the Red River Valley and the traders of the Hudson's Bay Company the settlement grew. Several forts were built, the last and strongest being Fort Garry, 1835. The first house was built outside the fort in 1860 and in 1874 a city charter was secured. Thereafter the growth was little less than phenomenal. The population was 136,035 in 1911 and 200,000 in 1921.

Winnipegosis (formerly Winnipegoos), a Canadian lake, is in southwestern Manitoba, west of Lake Winnipeg and northwest of Lake Manitoba. Winnipegosis is about 125 miles long and the maximum width is 20 miles; the area is approximately 2,100 square miles. This lake is drained into Lake Manitoba by way of Waterhen Lake and Waterhen River.

Winnipegosis is shallow and is navigable for small craft only. Large quantities of whitefish and pike are taken from the lake each year, and the fishing industry is slowly increasing in importance. There is considerable timber adjacent to the lake consisting of spruce, principally, with a smaller quantity of tamarack and birch.

Winnipegosis was discovered by Pierre de Varennes, a French-Canadian explorer, in 1749.

Winona, Minn., the county seat of Winona County, is situated on the Mississippi River and on the Burlington, Chicago, Milwaukee & St. Paul, Great Western and Northwestern railroads, 103 miles southeast of St. Paul. It is on a part of the Mississippi River that is noted for the rugged beauty of the bluffs and hills and is an important shipping point for lumber and grain. Its manufactures include great quantities of flour and flax fiber, wagons, boots and shoes, patent medicines, agricultural machinery and machine shop products.

Winona has a state teachers' college, Winona seminary, modern public schools and a library. In 1920 the population was 19,143.

Winstanley, Henry. See Eddystone.

Winston-Salem, the metropolis of North Carolina and the county seat of For-

syth County, is on the Southern, Norfolk & Western and Winston-Salem Southbound railroads, 110 miles west of Raleigh. It is on eight state highways and in 1923 was served by twelve interurban motorbus lines.

The city is the commercial center of a large cotton and tobacco growing and lumbering territory; and is near to coal fields and is provided with hydro-electric power. At the last industrial census there were almost 100 manufactories, engaged chiefly in the production of tobacco products, furniture, knit goods, woolen goods, rubber tires, cotton goods, lumber, wooden ware, wagons, bricks and flour.

Salem College, about twenty public schools and a library are evidence of the city's intellectual progress. There are several parks and a number of large playgrounds. The Auditorium, high school, Robert E. Lee hotel and the city and county buildings are among Winston-Salem's most conspicuous buildings.

Salem was founded by a band of Moravians in 1766, and the town of Winston was established in 1849 as the county seat of the then newly created Forsyth County. In 1913 the two settlements were jointly incorporated as Winston-Salem. In 1920 the population was 48,395, an increase of 113.2 per cent over 1910.

Winter, the cold season of the year. Astronomically, winter begins at the winter solstice, December 21, and ends at the spring equinox in March. Practically, however, the farther north, the longer the winter. From New England westward to the Cascade Mountains winter sets in usually in November and lasts until April in the United States. Farther north, heavy frosts and snow may be expected still earlier. In the southern hemisphere the seasons are, of course, reversed. Winter begins when the northern spring is at an end, and is most severe during our midsummer.

Popularly speaking, the northern winter is a time of comparative leisure and of merrymaking. Snow, skating, Thanksgiving Day, and the Christmas holidays are at hand. The long evenings give opportunity for reading and social enjoyment. The winter fireside, as described in Whittier's *Snowbound,* conveys an idea of snugness, comfort, and content unknown to the inhabitant of a clime where snow is not seen.

Winter, William (1836-1917), an American author and dramatic critic, was born at Gloucester, Mass. He was graduated from Harvard Law School in 1857, but turned at once to a literary career. After removing to New York City in 1859, Mr. Winter became literary editor of the *Saturday Press.* From 1865 to 1909, he was dramatic critic on the New York *Tribune.* He became well known for his critical articles, biographies of actors, his volumes of reminiscences, and for his verse. During several trips abroad, Mr. Winter collected material for such delightful travel books as *Shakespeare's England, Old Shrines and Ivy* and *Gray Days and Gold.* Other works by Mr. Winter are *Ada Rehan, Stage Life of Mary Anderson, Vagrant Memories, Days of the Stage, Old Friends* and *Life and Art of Edwin Booth. Poems, Other Shakespeare on the Stage.*

Wintergreen, a low plant of the heath family, producing aromatic red berries. The name comes from the leaves, which are evergreen. The plant and its bright fruit give a cheery aspect to the northern woods, but they are so low that they are early covered with snow. The flower hangs bell-fashion. Thoreau called it a "very pretty chandelier of a flower fit to adorn the forest floor." Wintergreen is a well known flavor obtained from the berries. Other names are box-, checker-, and partridge-berry. The latter name, in particular, is shared by the handsome trailing vine with red berries known to the botanist as Mitchella.

Wintergreen is a well known flavoring extract much used in candies and in medicine. The essence was first obtained from the leaves and berries of the wintergreen. Commercial wintergreen extract is now distilled chiefly from the bark of the tree known in New England and Canada as sweet birch. The oil has the fragrance and the composition of genuine wintergreen.

Winthrop, John (1588-1649), a colonial governor of Massachusetts. He was born near Groton, sixty miles northeast of London, in a region famous for the rise of Puritanism. His father, a man of substance and repute, wrote in quaint phrase: "John,

the only sonne of Adam Winthrop and Anne his wife, was borne in Edwardston abovesaid on Thursday about 5 of the clocke in the morning the 12 daie of January anno 1587 in the 30 yere of the reigne of Qu: Eliza." By the old style of reckoning time, the year began in March. When the correction in the calendar was made, it dated the beginning of the year from January 1; hence the apparent discrepancy.

At the age of fifteen, young John went to Trinity College, Cambridge, to study; and at seventeen he married, seemingly to his father's delight, and entered upon the practice of his profession. He was married four times. Correspondence between Margaret, the third wife, and Winthrop reveals the closest of companionship. When in London on legal business he appears to have lived in chambers. He ran errands for Margaret and rare Margaret sent him puddings, cheese, a turkey, and "syder," together with wearing apparel and housewifely hints for the care of his linen and the preservation of his health.

Winthrop was a man of intelligent character and influence. When, in 1629, the Puritan leaders secured a charter for the Governor and Company of the Massachusetts Bay in New England they decided to undertake emigration on a large scale and to transfer the management of the company to America. In looking about for a fit person to send out as governor the choice fell on Winthrop. Winthrop was in receipt of an income from Groton Manor and his practice of about $3,500, equal to $15,000 at the present day, but he wound up his business and set sail from Yarmouth with a company of 900 persons. After a tempestuous passage of eighty-seven days, during which seventy out of 200 cattle were tossed about to their death, the party landed at Salem. John Endicott, acting governor of a smaller party that had preceded, turned the management over to Winthrop at once. Save in off years, Winthrop was elected governor annually up to the time of his death.

Winthrop was a shrewd, patient, unselfish ruler. He obtained supplies from England, founded small settlements in supporting distance of each other, carried on a thrifty trade, not for himself, with the Indians, and gave himself and his property untiringly to the interests of the colony. During his life he was always and easily the first man in the colony, but his road was not strewn with roses. In matters of government, Winthrop, like Carlyle and Ruskin, was opposed to a pure democracy. He held that the wiser portion of the community should be allowed to govern the rest. He insisted that obedience should be yielded the dignitaries of the church, and to him the church was the same as the state. His personal theory of government is often quoted: "The best part is always the least, and of that best part, the wiser part, is always the lesser." The spirit of equality or democracy was strong in the colony, and Winthrop was set aside for a term or two; but he had the sound sense and the bigness of soul to yield to the will of the people. On one occasion he was impeached, with other magistrates, for exceeding the magisterial authority. The occasion was trifling, the appointment of a captain of the Hingham train band, and the pastor of Hingham was the accuser. Winthrop was acquitted by the legislature or "General Court." At the conclusion of the trial he resumed his place of authority and begged "leave for a little speech," which for dignity, plain dealing, simple sublimity, and devotion to duty, far outranks any effort of Webster, Everett, or Choate.

On one occasion Winthrop was assailed for leniency unbecoming the chief magistrate. Roger Williams was not mentioned by name, but it was understood that Winthrop had erred in suffering that disturber to go in peace and even with Winthrop's brotherly goodwill to Rhode Island. Sir Henry Vane, a man of lighter mood, took an active part in Boston politics and even superseded Winthrop for a time; Anne Hutchinson made trouble; but, all said, John Winthrop was the man under whom the colony throve; the one man who never talked of giving up and of going back to England; the man of all others who accepted results in good faith and let the past be past; and the man in whose uprightness, sense of justice, and unselfishness the people did not lose faith. He not only served for years without pay, but he sold his estates in England and spent his fortune

ungrudgingly for the good of Boston and Massachusetts Bay. It is his due to say that John Winthrop was the greatest of Puritan colonists. The old Winthrop home in Boston Harbor, long known as "the Governor's Garden," is now the possession of the general government and is the site of Fort Winthrop.

Beginning when he was off the Isle of Wight on his outward journey, Winthrop kept a private journal of colonial transactions. In this he speaks of himself as of any other public official thus: "In this sickness, the governor's wife, daughter of Sir John Tindall, knight, left this world for a better, being about fifty-six years of age, a woman of singular virtue and specially beloved and honored of all the country." In the same impartial way he recorded just and wise observations of men and factions, a chronicler above vain glory, a traveler to the world to come, who would fain leave a blaze here and there to guide the footsteps of those to come after. Two volumes were published in 1790. The manuscript of a third volume was long supposed to have been lost, but in 1816 was found in the tower of Old South Church and was incorporated in a new printed edition.

A son of the same name followed his father to the New World and was instrumental in the founding of the colony of Saybrook. He later served many years as governor of Connecticut. A great grandson, also of the same name, was one of the early graduates of Harvard and became a professor of that institution. He was a friend of Benjamin Franklin and of Count Rumford. See WILLIAMS, ROGER.

Wire, a thread, or small rod of metal. The making of wire depends on a property of metals known as ductility. In production, a piece of metal is drawn through a series of holes in a hardened steel plate. A rod or bar once formed is drawn through a succession of holes each smaller in diameter than its predecessor. In this way, even the finest wires may be made. Gold, silver, platinum, iron, copper, zinc, tin, lead, and nickel may be made into wires. Platinum has been drawn into wire 0.000165 inch in diameter, so fine as to be scarcely visible to the unaided eye. Fine gold wire, known as gold thread, was much used by the ancients for purposes of embroidery. It was made by a process of hammering and dividing. The earliest wire making by drawing rods through holes without the aid of the hammer, was first practiced, so far as known, at Augsburg and Nuremberg about the middle of the fourteenth century.

Wire is known in the trade by number, according to its diameter. A number twelve piano wire is 0.029 inch in diameter. A well made steel wire has wonderful strength. The number twelve wire mentioned is able to support a weight of 225 pounds, equivalent to 1,000 tons per square inch of section.

Wire is now applied to many uses. In the United States alone about half a million tons are converted annually into wire nails. Wire is used in the construction of cables and of ropes requiring great strength where flexibility is not necessary. Suspension bridges are hung on wire cables. An immense amount of steel, copper, and aluminum wire is used to transmit electricity Since the Civil War, wire, both barbed and smooth, has taken the place very largely of wooden fencing.

Wireless Telegraphy, the art or method of transmitting and receiving telegraph messages without the use of conducting wires, usually abbreviated in popular usage to "wireless," and recently supplanted to a large degree by the comprehensive popular term "radio," which is now applied to both wireless telegraph and wireless telephone systems.

Remarkable progress has been made in recent years in methods of wireless communication, through the use of electromagnetic waves which propagate wireless messages with the speed of light, traveling at the speed of 186,000 miles a second. It was the discovery and utilization of these "Hertzian" waves which caused the wonderful development of this means of communication, both by telegraphy and by telephony, for prior to their discovery there were several methods of transmitting messages for short distances without wires.

The first wireless telegraph signals were transmitted across the Atlantic on December 16, 1901, the signals being sent from a station at Poldhu, in Cornwall, England, to Glace Bay, Nova Scotia. "Twenty

years later, we find the world covered with gigantic power stations for transmitting half round the world electromagnetic waves of immense energy for telegraphic purposes, employing thousands of horse-power and exhibiting in every part the results of immense scientific thought and invention, the outcome of very costly experiments by numerous talented radio engineers and experts. Thirty years ago the ether round the earth was undisturbed except by the short-wave disturbances which affect our senses as light and heat. Now it is everywhere traversed by long waves or billows which are the waves employed in wireless telegraphy."

One of the great practical results of wireless development has been to make travel by sea safer than it ever was before. It is estimated that at least 5,000 persons owed to wireless their rescue from death by drowning, even before the World War in 1914, and during the war many more were saved by this means from submarine attacks on merchant vessels. In many ways wireless was utilized during the war to great advantage, from transmitting messages from the trenches to guiding vessels through hidden dangers at sea. Both telegraph and telephone sets were employed for these war purposes, and the necessities of the war in fact gave a great impetus to the development of the wireless telephone, or radiophone. Wireless telegraphy was no sudden discovery, for efforts to develop one form or another of wireless go back nearly a century. The early experiments involved either volume distribution of electric current throughout a large area of moist earth or water, the propagation of energy from one circuit to another by electromagnetic induction, or such propagation by means of electrostatic induction. But the foundation on which modern wireless is based is the action of electromagnetic waves. The science of electromagnetic radiation is one of the greatest and most fundamental branches of modern physics; and the essential characteristic of the theory on which wireless telegraphy is based directed attention, not so much to electrified bodies themselves, as to the space surrounding them. In other words, in the case of an electric current flowing along a wire, the new theory dealt, not with the wire, but with the space surrounding the wire. The wire itself was known to be in a peculiar condition, but it was found that the space surrounding it had properties as remarkable as those of the electrified wire, and on this finding wireless was built.

Pioneer work in wireless was done by James Clerk. Maxwell, who in 1865 as a result of his researches in physics was led to declare that visible light consists of electric waves in the ether. For years the importance of Maxwell's statement was unrecognized, and it was not until 1887 that interest was really aroused in the subject when Heinrich Hertz gave an experimental proof of the correctness of Maxwell's assertion. Hertz showed that the ether of space would transmit electric waves, and also how these waves might be produced and detected.

Soon after Hertz's experiments, the suggestion was made that the newly discovered Hertzian waves might lead the way to success in telegraphing without wires. But the apparatus devised by Hertz for producing and detecting electric waves in the ether was not suited for practical adaptation to telegraphy. In 1890, however, the invention of the "coherer" by Branly proved a decided step in advance. He noted the remarkable fact that metal filings, when loosely packed in a small glass tube normally formed a very poor conductor of electricity, but that they became a good conductor under the influence of a nearby electric spark; the action of the spark apparently being to weld the metal grains lightly together. Hence the name "coherer" applied to Branly's device, which proved to be a much more sensitive means of detecting electric waves than the device used by Hertz.

Then came Marconi, who between the years 1894 and 1896 began the experiments which were destined to become famous. He devoted himself first to improvements in the coherer, and adopted an idea of using an electromagnetic buzzer to decohere the coherer between signals. He also found that the coherer, when placed between an earth connection and a wire running to a

large metal screen supported in the air, became a very sensitive detector of electric waves. Marconi also modified the original oscillator of Hertz by connecting one terminal of the spark gap to the earth and the other to a large aerial conductor. By this means, which was the first use of what is now called an antenna, he was able greatly to increase the efficiency and amount of energy radiated from the oscillator.

Sir Oliver Lodge had meanwhile devised a system of wireless telegraphy in which inductive coupling was used, and in which the natural period of the antenna circuit was made equal to the period of the oscillating circuit. Lodge's antenna was not earth connected, like Marconi's, but consisted of an upper and lower conducting surface, an arrangement which has come into considerable use in recent years and is known as an antenna with counterpoise. Patents on inductive coupling and tuning were taken out by Lodge, Marconi, Arco and Slaby, and others, and before long means were provided for greatly increasing the amount of electric energy radiated as well as for sharpening the frequency of radiation. In 1900 Marconi and others showed that two messages could be simultaneously received on different wave lengths by one antenna.

An important development came in 1908, with the invention by Wien of the "quenched spark," which narrowed materially the band of wave lengths radiated from a transmitting station and made sharper tuning possible. Other developments from time to time included a new form of arc which, invented by Poulsen of Denmark, proved a satisfactory generator of oscillating currents up to frequencies of 20,000 to 30,000, and, as subsequently developed, is used in many of the largest radio telegraph stations throughout the world. The development of the arc, which supplied a source of continuous waves, gave promise of making radio telephony practicable, but until the advent of the vacuum tube no satisfactory means was found of effecting the necessary modulation with speech frequencies. (See RADIO).

An improved form of continuous wave generator is the high frequency alternator. The importance of continuous-wave radio telegraph lies in the fact that it makes possible the use of larger amounts of power than the spark, and it also permits the generation of narrower bands of waves, thus tending to reduce interference between simultaneous messages. Within the past few years the vacuum tube, or thermionic amplifier, has become one of the most important types of generator for continuous waves. It was introduced by De Forest in 1906 as a detector and amplifier of electric waves, and although it proved under favorable conditions to be extremely sensitive in these capacities, it was not entirely reliable. The vacuum tube, or "audion," as made by De Forest, was gradually improved, however, and vacuum tubes of large size are now being produced for handling very large amounts of energy, both for wireless telegraphy and radio telephony. The vacuum tube has also been generally responsible for the rapid development during the past few years of radio broadcasting.

It was in 1901, as stated, that Marconi first succeeded in telegraphing certain signals across the Atlantic, and in 1903 a complete wireless message was sent. In 1904 a regular telegraph service to handle press news and private messages was begun from Poldhu in Cornwall and Cape Breton to Atlantic liners. By 1906 the use of radio-telegraphy by steamships had so demonstrated its value as a means of increasing the safety of travel at sea that an International Radio Convention was called to meet in Berlin, to consider the advisability of establishing certain uniform international practices. The articles adopted by this convention, which dealt largely with the international use of the radio telegraph, particularly as concerned its use by ships at sea, were subscribed to by practically all nations In the next year press dispatches were being handled by radio-telegraphy across the Atlantic.

In 1910, after a collision between the steamships *Republic* and *Floria* at sea, the radio-telegraph summoned aid which resulted in saving the lives of all on board. The second International Radio-Telegraph Convention was held in London in 1912.

After the close of the World War, development of the radio art in the United States was threatened because of the diversified ownership of essential patents. At the suggestion of the United States government the leading holders of these patents, namely, the American Telephone & Telegraph Co., the General Electric Co., the Radio Corporation of America, and the Westinghouse Electric & Mfg. Co., entered into a cross-licensing agreement, permitting each company to avail itself of the patents of the others in its particular field. By means of this agreement the greatest research and development staffs in the world have been freed to develop the public service feature of radio without fear of patent infringement.

In 1921-1922 many radio telephone stations, in cities throughout the United States, adopted the practice of broadcasting programs of music and other entertainment regularly for the purpose of focusing popular interest upon radio. Late in 1922 the number of broadcasting stations was 546 and fully 2,000,000 people were "listening in" nightly. Thus the development of wireless telegraphy has led to wireless telephony's becoming a familiar feature of American home life. See RADIO.

Wisconsin, one of the east north central states, commonly known as "The Badger State," stands twenty-fifth in point of size, with an area of 56,066 square miles. It is one of the northern tier of states, and is bounded by Lake Superior and Michigan on the north; on the east by Michigan and Lake Michigan; on the south by Illinois and Iowa; and on the west by Iowa and Minnesota.

THE PEOPLE. The population of Wisconsin was 2,632,067, the state thus ranking thirteenth. Of the total, 460,128, or 17.5 per cent, were foreign born, the largest element being German. The people are distributed in the proportion of 47.6 to a square mile, and are 47.3 per cent urban. Milwaukee, the metropolis, has 457,147 inhabitants, while the second city, Racine, has 58,593. Other cities having more than 20,000 residents will be found in the table at the end of this article. The capital of Wisconsin is Madison.

SURFACE AND DRAINAGE. The broad rolling surface of Wisconsin is broken by no sharp mountains, though there are two ranges of low, rounded hills. From north to south and east of the median line extends one of these ranges; the other crosses the state from east to west about 40 miles south of the northern border. The highest point in the state— Rib Hill, 1,940 feet—is in the longest range. Some points on Lake Michigan are marked by high limestone bluffs, and the same is true of certain points on the Mississippi River; but no doubt the greatest scenic attractions in the state are to be found along the Wisconsin River.

The Mississippi forms a part of the Wisconsin-Minnesota boundary and all of the Wisconsin-Iowa line, while for a little distance the Menominee River separates Wisconsin from Michigan. A few inconsiderable rivers of the state drain into Lake Superior, and some larger ones, as the Menominee and Fox, flow into Lake Michigan; but the greatest drainage—by way of the St. Croix, Chippewa, Black and Wisconsin rivers—is into the Mississippi. Only the Wisconsin and Fox rivers are navigable within the state, and these have been linked together by canal and afford direct passage from the Mississippi across the state to Green Bay and Lake Michigan. Only very small craft, however, can make the passage.

Wisconsin has about 3,000 lakes, large and small, of which Lake Winnebago is the largest. The Fox River flows through Lake Winnebago, which is thus connected with Lake Michigan. The lakes in the northern part of the state are justly popular with those who enjoy life in the open near woods and water; and in the south, Lakes Geneva and Mendota are locally notable summer resorts.

MINERALS. Wisconsin is rich in minerals, in zinc, iron, coal and building and lime stone, especially. Zinc, lead and iron are mined in the southeastern corner of the state, and iron of the highest quality is found on the Menominee River and around the head of Lake Superior. Granite and sandstone are important products, and clays, pyrites, copper and silver are found in small quantities. The latter are of local importance only.

AGRICULTURE and the allied dairying and

THE BADGER STATE

WISCONSIN

1. Logging
2. Grains
3. Fishing
4. Iron Mining
5. Violet—State Flower
6. Paper Making
7. Cherries
8. The Dells
9. Dairying
10. Tobacco
11. Manufacturing
12. State Capitol

stock raising, are the mainstays of the state. All temperate zone cereal crops thrive, and fruits and vegetables of the first quality are grown. The most important crop is corn. This is followed by oats, tobacco, potatoes, rye, wheat, hemp, flax seed, clover seed, hay, sugar beets, barley and buckwheat. The greatest agricultural areas are south of the center of the state. The most valuable fruit crop is the apple, though plums, pears and cherries of fine quality are grown.

Wisconsin leads the Union in the quantity, quality and value of its dairy products. The number of milk cows is almost 2,000,000; the annual output of butter is well over 125,000,000 pounds, and cheese and condensed milk are made in proportionate quantities.

MANUFACTURE. By the last industrial census the state had 10,393 manufacturing establishments capitalized at $1,371,729,196 producing almost $2,000,000,000 worth of goods annually. The most important product is the finished lumber made from the timber stands in the state's 13,000,000 acres of forests. Other very valuable commodities are agricultural implements, varied machinery, flour and grist, cheese and butter, leather, abattoir products, foundry products, canned vegetables, ships and boats, wood pulp, paper, furniture, refrigerators, wagons and automobiles. The cities listed in the appended table are the centers of manufacture.

TRANSPORTATION. With about 300 miles of navigable rivers, frontage on two of the Great Lakes and 7,775 miles of railroads, besides its excellent highways, the state is amply provided with transportation facilities. Superior, Ashland and Milwaukee are the largest lake ports.

The principal railroads in the state are the Chicago & Northwestern, Chicago, Milwaukee & St. Paul, Northern Pacific, Green Bay & Western and Minneapolis, Saint Paul & Sault Sainte Marie.

INSTITUTIONS. A state board of control is in charge of the charitable and correctional institutions, which include the State Hospital for the Insane, Northern Hospital for the Insane, Milwaukee Hospital for the Insane, schools for the deaf and the blind, Hospital for the Criminal Insane, State Tubercular Sanitarium, Home for the Feeble-Minded, Industrial School for Boys and the penitentiary.

EDUCATION. Primary education is compulsory for all children between the ages of seven and fourteen. In 1920 there were 405,467 pupils enrolled in the public grade schools. The 373 public high schools had 59,776 pupils. The state maintains nine normal schools and the University of Wisconsin.

The latter—the highest institution in the state—was founded at Madison in 1838. It is one of the greatest of state universities, and conducts a great variety of activities, all vital to the needs of Wisconsin's citizens.

It is organized into colleges of letters and science, agriculture, engineering, medicine, law and music, and maintains a library school, a graduate school, a division of physical education and a division of university extension. The work of this institution in raising the literacy standard of the state, in furthering agriculture by the application of science, and in making direct contributions to pure science, is truly remarkable. In 1922 there were 885 instructors and 11,367 students.

The most important private institutions are Milton College, Beloit College, Ripon College, Milwaukee-Downer College for Women and Lawrence University.

GOVERNMENT. Wisconsin is governed under its original constitution, which was adopted in 1847. This provides for a bicameral legislature, the senate to have 33 and the house of representatives 100 members. Senators are elected for four and representatives for two years. Executive power is vested in the governor, lieutenant-governor, secretary of state, attorney-general, treasurer, superintendent of public instruction and insurance commissioner. All executives except the superintendent of public instruction are elected for two years.

The judiciary consists of a supreme court of seven justices elected for ten years, circuit courts, probate courts and courts of justices of the peace.

HISTORY. French explorers, who entered what is now Wisconsin in the first half of the seventeenth century, were the first white men to gather information regarding this

region. Joliet and Marquette journeyed across the state by way of the Fox and Wisconsin rivers, and in 1669 the nucleus of a permanent settlement was made when a mission was established on the Fox River at what is now De Pere. England gained possession of this land by the Treaty of Paris of 1763, and soon after the settlements at Milwaukee, Green Bay, Portage and Prairie du Chien wore an air of permanence.

After the American Revolution this region became a part of the Northwest Territory, but few settlers appeared until after the discovery of valuable deposits of lead in 1822. Wisconsin was successively included in the territories of Indiana, Illinois and Michigan, but was organized as a separate territory in 1836. Settlers appeared in large numbers; a government was organized; and in 1848 Wisconsin was admitted to the Union. Lumbering, mining and agriculture were the first large industries, but later the manufacturing industry also became prominent. Wisconsin has made rapid and long strides forward—politically, socially and economically.

STATISTICS. The following statistics are the latest to be had from trustworthy sources:

Land area, square miles	55,256
Water area, square miles	810
Forest area, acres	16,000,000
Population (1920)	2,632,067
White	2,616,938
Negro	5,201
Indian	9,611
Foreign born	460,128
Chief Cities:	
Milwaukee	457,147
Racine	58,593
Kenosha	40,473
Superior	39,624
Madison	38,378
Oshkosh	33,162
Green Bay	31,017
Sheboygan	30,955
La Crosse	30,363
Fond du Lac	23,427
Beloit	21,284
Eau Claire	20,880
Number of counties	71
Members of state senate	33
Members of house of representatives	100
Salary of governor	$5,000
Representatives in Congress	13
Assessed valuation of property	$4,570,698,530
Bonded indebtedness	$2,160,291
Farm area, acres	22,745,000
Improved land, acres	13,248,000
Corn, bushels	97,482,000
Oats, bushels	63,958,000
Potatoes, bushels	21,420,000
Barley, bushels	10,642,000
Rye, bushels	4,756,000
Wheat, bushels	2,812,000
Clover seed, bushels	211,000
Tobacco, pounds	61,488,000
Hay, tons	4,573,000
Sorghum syrup, gallons	140,000
Wool, pounds	3,360,000
Domestic Animals:	
Horses	674,000
Mules	3,000
Milk cows	1,828,000
Other cattle	1,478,000
Sheep	632,000
Swine	2,236,000
Manufacturing establishments	10,393
Capital invested	$1,371,729,196
Operatives	263,949
Raw material used	$1,127,274,961
Output of manufactures	$1,840,984,307
Lumber, feet	1,000,000,000
Pig iron, tons	226,863
Dairy products	$144,457,000
Miles of railway	7,775
Teachers in public schools	17,301
Pupils enrolled	465,243

Wister, Owen (1860-), an American novelist. He was born in Philadelphia. Having been graduated from Harvard, he studied law and was admitted to the bar in 1889. He practiced his profession a short time only preferring to devote his time to literature. His writings include *The Modern Swiss Family Robinson, Lin McLean, The Virginian,* and *The Jimmy John Boss and Other Stories.* Wister has produced successful work in the line of biography; *Oliver Wendell Holmes* was published in the "American Men of Letters" series, and *Benjamin Franklin* in "English Men of Letters" series. He wrote also a biography of U. S. Grant.

Witchcraft, sorcery, the practice of the "black art." A witch may be a person of either sex, but particularly a woman, who has made a bargain with the devil. Later and better usage applies the term witch exclusively to women. The corresponding masculine word is wizard. From the remotest age the notion has been prevalent that certain persons sell their souls to the devil, receiving in return a diabolical power to

commit acts beyond the ability of human beings. Witches were believed able to pass through keyholes, to ride in the air on broomsticks, to sail on the ocean in a sieve, to bring sickness on an enemy, and to perform many other acts of an evil nature. Their arts were practiced for evil, not for good. Not infrequently witches were believed to have power of prophesy. The Hebrews believed in witches. Saul, it may be remembered, visited the witch of Endor, a woman possessed of a familiar spirit, in order to inquire his probable fate at the approaching battle of Gilboa. Joan of Arc was condemned and burned as a witch in 1431. In 1484 Pope Innocent VIII issued a papal bull against sorcery. During the three centuries that followed it is estimated, but on somewhat discredited authority, that 300,000 women were executed in Europe on imaginary charges. The last European execution occurred at Glarus, Switzerland, in 1782. As late as 1770 two negroes were burned at Kaskaskia at the door of the French church but under Virginian authority. The delusion lingered longer in Spanish-America than elsewhere. Five alleged witches were burned alive by a mob in Mexico as late as 1877. The Spanish Inquisition was intrusted with the duty of burning witches.

Henry VIII of England employed witch detectives to travel the country and bring witches to the stake. Macbeth is represented by Shakespeare as consulting the three weird sisters. About this time, James VI of Scotland, afterward James I of England, ordered the torture applied to discover the cause of the tempests which had troubled his homeward passage with his bride, Princess Anne of Denmark. "Dr. Fian, while his legs were crushed in the boots, and wedges were driven under his finger nails, confessed that several hundred witches had gone to sea in a sieve from the port of Leith and had raised storms and tempests to drive back the princess." It is said that the royal James attended the trial by torture of 200 witches who were burned for producing this storm. As substantial an authority as the *Encyclopedia Britannica* in the issue of 1797 says: "The reality of demoniacal possession stands upon the same evidence with the gospel system in general."

It is not strange that the delusion of witchcraft should have had a run in the American colonies. The English laws against witchcraft were adopted in New England as early as 1678, and some forty persons were executed, half of them during the "Salem madness." It was in 1692 that this terrible outbreak occurred. A niece and daughter of the parish minister at Danvers, then a part of Salem, began to act strangely. They accused an old servant woman in the family of bewitching them. The alarm of the family spread to the community and the colony. A terrible fear spread like a panic. It was believed that the colony was full of persons in the service of the devil and that no one's person or soul was safe from the machinations of the evil one.

A belief in a secret society of poisoners could not create more excitement at the present time than did this New England belief in witches. Scarce anyone escaped suspicion. Even magistrates and clergymen were accused. One worthy minister, a Mr. Burroughs, was executed. Cotton Mather, a leading clergyman of the day, an eminent scholar and divine, did much to encourage the investigation. During the summer of this year twenty persons were put to death. When the legislature convened in October there were 150 accused persons in prison. The public had no sooner time to rally than the scales fell from people's eyes and the cause of the excitement was seen clearly to be a delusion.

Witch Hazel, an ornamental American shrub six to thirty feet in height. Yellow flowers appear late in autumn. Later the handsome green foliage assumes autumn colors. It is not a hazel at all. The witch of the name is said to be allied to weak, and is often spelled wych, meaning feeble or drooping, as in the case of the wych elm. Formerly forked or Y-shaped branches were used to find water. The operator seized a branch in each hand and went about holding his divining rod straight in front of him. When he came over a supply of water the stem of the hazel was supposed to become agitated and to point downward toward the water. There the well must be dug. In a well watered country the diviner seldom failed to locate a good well. The

notion may not have died out yet. A decoction of witch hazel bark is used as a remedy and is a grateful lotion for the face, especially after shaving. The botanical name of the witch hazel is *Hamamelis Virginiana*. The witch hazel is not related to the nut-bearing hazels.

Witte, Sergei Yulievitch, Count (1849-1915), an eminent Russian statesman, was born at Tiflis. He was educated at the University of Odessa, and after a brief career of journalism entered into the railway service in 1870. Because of his ability in transporting troops over the Odessa Railroad during the Russo-Turkish War, Count Witte was appointed general traffic manager of the Southwestern Railway in 1879. Some years later, he became a member of the Imperial Railway Commission, and in 1888 was made chief of the Imperial Railway Department and president of the Tariff Commission.

In 1892, Count Witte was appointed Minister of Communications, and was soon made Minister of Finance. In this position he promoted industrial development, introduced the gold standard and established government monopoly of the sale of vodka. He also increased the revenue and negotiated large foreign loans. Opposition to Count Witte's policy culminated in his removal as Minister of Finance in 1903. He was appointed president of the Committee of Ministers. It was this committee that worked out a new administrative policy after the agitation for constitutional reform assumed alarming proportions. Count Witte was senior Russian plenipotentiary in the peace negotiationtions with Japan at Portsmouth, N. H., in 1905. Upon his return to Russia, he was chosen president of the first Constitutional Ministry. His Premiership was short, for he resigned in 1906 because of lack of popular support and differences with the emperor.

Wittenberg, a German town on the Elbe midway between Berlin and Leipsic. Wittenberg is noted chiefly in connection with Luther and Melanchton whose statues adorn the marketplace and whose bodies lie buried beneath bronze slabs in the chief church of the city. The church doors to which Luther tacked his ninety-five theses were burned in 1760 and have been replaced by bronze doors bearing in raised type the original Latin text of the theses. The buildings of the old university, mentioned in Hamlet, the institution in which Luther and Melanchthon were professors, have been taken over for military barracks. See LUTHER.

Woad, a well known plant of the mustard family. The term woad is akin to weed. The woad was formerly much cultivated in Great Britain for the sake of a blue die which was extracted from the leaves by grinding, fermenting, and soaking. Woad is still cultivated in some parts of Europe, but has been supplanted by indigo which gives a more intense blue. Woad was a favorite die with the early inhabitants of Great Britain. They are said to have stained their bodies with it, Indian fashion.

Woburn, Mass., an important center of leather manufacture, is on the Boston & Maine Railroad, 10 miles northwest of Boston. Besides leather and leather working tools and machinery, glue and chemicals are manufactured here.

The city has good schools, a public library and a valuable art collection. As a residential suburb of Boston it contains many beautiful homes. It was settled in 1641 under the name of Charlestown Village, and was incorporated as a distinct town, Woburn, in 1642, becoming a city in 1888. In 1920 the population was 16,574.

Wolf, a crafty, rapacious animal of the dog family. Of all wild animals the wolf is most closely related to the dog. There are numerous species found chiefly in the north temperate zone. The corresponding animals of warmer clime are the jackal and the hyena. The last wolf in Great Britain was killed in 1710, but wolves are still numerous in some parts of France, Hungary, Spain, and Turkey. Thrilling tales are told of travelers run down by wolf packs on the forest roads of Russia. The common wolf of North America is very much like that of Europe. It stands about twenty-six inches high at the shoulder. The body is about forty-eight inches long, with an additional fifteen inches of tail. The nose is sharp. The sense of smell is keen. The eyes are deep set. The face is

crafty. The fangs are formidable. The body is lithe, tough, and full of endurance. The foot is light and full of speed. The winter coat is long, shaggy, and coarse, well calculated to stand the storm. It varies in color from black in Florida and red in Mexico to white in Alaska.

The character of the wolf is well set forth in the nursery tale of Red Riding Hood. It is strong, cunning, ravenous, merciless, and we may add, cowardly. The wolf has none of the nice ways of a fox; none of the generous, faithful characteristics of the dog. It is an inveterate thief. It cannot be petted; it cannot be trusted. In captivity a wolf may be pounded or caressed, fed or starved, and it is a mean-spirited, treacherous, snapping, quarrelsome wolf yet.

In the wild the common wolf lives in the timber or on the prairie. It is active at all seasons of the year. The young, five in number, come early in May. They are of a brown color and weigh about a pound each. The female chooses a den in the bank of a ravine, in a cave, or in a burrow under a pile of brushwood.

Ordinarily wolves hunt separately or in small families, living on rabbits, partridges, and other small birds and animals, giving clearings and human habitations a wide berth. Wolves are the natural enemies of the young buffalo and the fawn, the calf of the moose and of the musk ox. In times of food scarcity the wolf grows bolder and attacks the farmer's sheep, hogs, calves, and stray poultry. Under some circumstances wolves gather in packs and hunt the larger animals. As distinguished from the prairie wolf or coyote, they are called timber wolves, and are frequently reported to have chased people, but instances of human life taken by American timber wolves are very few. Most states offer a bounty of from $2 to $10 for the destruction of a wolf. The common wolf, the timber wolf, the buffalo wolf, and the gray wolf, are names for the same animal, as distinguished from the coyote or prairie wolf.

See COYOTE; DOG; FOX.

Wolfe, wulf, **James** (1727-1759), an English general. He was a native of Kent. He was educated at Greenwich. At the age of twenty-five he entered the English army as an ensign in a regiment of infantry. Two years later he was the captain. He took part in the battles of Falkirk and Culloden, and was engaged subsequently in garrison duty on the Scottish border. Pitt recognized the young soldier's ability and sent him to America under Amherst with the rank of brigadier-general. Wolfe was instrumental in the capture of the fortress of Louisburg in 1758. He became known at home as the hero of Louisburg. In the following campaign Pitt again advanced Wolfe above his seniors, made him a major-general, and intrusted him with the general conduct of operations against Quebec. The story of scaling the heights in the darkness, of occupying the Plains of Abraham, the battle with Montcalm on the following morning, and Wolfe's expiration in the arms of victory is a familiar one. A tall granite obelisk has been erected to the memory of the two generals. It stands on the field of battle. Wolfe had the honor of winning Canada for his country. His remains were carried home to England and buried at Greenwich. A memorial was erected in his memory in Westminster Abbey. See QUEBEC; ST. LAWRENCE.

Wolseley, Garnet Joseph, Viscount (1833-1913), a distinguished British soldier, was born at Golden Bridge, County Dublin, Ireland. He entered the army in 1852, and in the Burmese War of 1852-53 was severely wounded. He was twice wounded in the Crimean War, and for his valorous service in this conflict was given the cross of the Legion of Honor, and was promoted to the rank of major. Viscount Wolseley, after serving in India during the Sepoy Rebellion, was with the Chinese expedition of 1860. Going to Canada in 1870 as commander of the Red River expedition, he suppressed the first Riel Rebellion at Fort Garry. For this service, Viscount Wolseley was created knight of the Order of St. Michael and St. George. As major-general, he commanded Britain's troops in the Ashanti War of 1873-74. For distinguished services during this campaign, he received the thanks of Parliament and a grant of $125,000. His name became popular all over Great Britain, and he was considered the foremost of her military men.

In 1882, he was in command of the British forces in Egypt. Here he defeated and captured Arabi Pasha at Tel-el-Kebir. Again in 1884 he was in Egypt, this time to rescue General Gordon, who was desperately besieged at Khartum. But he was too late to be of assistance. In 1895, Viscount Wolseley was made commander-in-chief of the British army, and before his resignation in favor of Lord Roberts in 1900, he did another great service in improving the methods of the British war office.

Wolsey, wul′zĭ, **Thomas** (1471-1530), an English cardinal and statesman. He was the son of an Ipswich butcher. He was educated at Oxford University, and on graduation was elected to a scholarship which gave him an opportunity for further study. While master of a grammer school, he taught the three sons of the Marquis of Dorsett, through whom he obtained an appointment to the pastorate of Limington. Later, he became chaplain to the Archbishop of Canterbury, who recommended him to Henry VII. Henry VIII recognized Wolsey's ability and advanced him rapidly from one church dignity to another. In 1515 he was made cardinal by Pope Leo X, and Henry made him his lord chancellor. In the delicate matter of obtaining a divorce from Catherine in order that he might marry Anne Boleyn, Henry felt that he did not have the full support of Wolsey. Anne considered the cardinal her personal enemy. Resentment and suspicion soon brought about Wolsey's downfall. In 1530 he was arrested in Yorkshire on a charge of high treason and died at Leicester Abbey on his way to the Tower of London. His last words are said to have been these: "Had I but served my God as diligently as I have served my king, He would not have given me over in my gray hairs." Shakespeare has used this thought artistically in his play of King Henry VIII. Wolsey cries out to his secretary:

Cromwell, I charge thee, fling away ambition;
By that sin fell the angels; how can man, then,
The image of his Maker, hope to win by it?
. . . . O, Cromwell, Cromwell!
Had I but served my God with half the zeal
I served my king, He would not in mine age
Have left me naked to mine enemies.

Wolverine, wul-vẽr-ēn′, literally a little wolf, the common glutton of Europe and northern North America. It is a large, strong animal belonging to the weasel family, but it walks on the soles of the feet instead of on its toes. It has rough, dark hair with pale stripes on the sides. It walks like a small bear, and looks like a large shaggy skunk. It inhabits forest regions. The pelt is valuable, especially for robes and rugs; but the animal's sagacity is such that it is difficult to trap. It follows the trapper's trail, springing traps and stealing the bait without being caught. It devours the choicest portions of animals in the traps and ruins their pelts. The wolverine and the fisher are the especial dread of the North American trapper. There is no satisfying a wolverine. It will break into a cabin and proceed deliberately to destroy and defile all that it cannot eat. It will scatter a package of rice, and strip bedding into shreds. A person seemingly could not show more destructive ingenuity. Cruisers, surveyors, and trappers frequently find it desirable to cache, that is, to bury, a part of their provisions against the return trip. No other animal has equal sagacity in finding a cache. Other animals satisfy their hunger and leave, but the wolverine takes a malicious pleasure in destroying everything in reach. The French call the wolverine the carcajou. In Wyoming it is called the skunk-bear. The Indians of Washington call it the mountain devil. Michigan has been nicknamed the Wolverine State.

Woman's Christian Temperance Union, a national organization of women designed to promote temperance and other work, known for short as the W. C. T. U. The organization was effected in Cleveland, Ohio, in 1874. There are branches in every state and territory, embracing 10,000 local unions and possibly half a million members. Much has been done to guard minors by salutary laws and to promote temperance legislation. National headquarters are maintained at Evanston, Illinois. In 1883 a world organization was formed, largely through the influence of Frances E. Willard. There are auxiliaries in over fifty countries. A white ribbon is the W. C. T. U. badge the world over. See WILLARD.

Woman's Relief Corps, a patriotic organization formed by mothers, wives, sis-

ters, and daughters of the Union soldiers of the Civil War. It is modeled in part according to the plan of the Grand Army of the Republic, being divided into some forty departments and subdivided into corps. At present there are about 222,000 members and the society has appropriated over $2,000,000 for the support of widows, orphans, and dependents of Union veterans. See GRAND ARMY OF THE REPUBLIC.

Woman Suffrage. In the United States, Australia, New Zealand, the Isle of Man, Finland, Norway and Sweden, women have full suffrage. In Great Britain they vote except at Parliamentary elections. Full suffrage was conferred upon the women of the United States by the ratification of the nineteenth amendment to the Constitution during the summer of 1920, after many years of struggle and propaganda on the part of the women. The women cast a large and influential vote at the presidential election in 1920.

CANADA. Provincial suffrage was at first accorded women by the Canadian provinces of Nova Scotia, Ontario, British Columbia, Alberta, Saskatchewan and Manitoba, and in the other provinces they have municipal, or school, suffrage. The mothers' wives, daughters, sisters and widows of men in active service were granted Parliamentary suffrage by a war-time election law passed in 1917. But later, manhood and womanhood suffrage for all Dominion elections went into effect. See ANTHONY; HOWE; LIVERMORE; WILLARD.

Wombat, a pouched animal of Australia. Wombats are hairy, crouching animals with feet somewhat like those of a bear. They have the teeth of a squirrel and live chiefly on grass and other herbs, holing in a bank like a woodchuck. They carry their young in a pouch. There are three species, all confined to the Australian region where they are hunted for their flesh.

Women's Clubs, associations of women organized for various purposes such as recreation, study, civic or social improvement, or for the promotion of philanthropic or political ends. The literary and social class, their meetings being given to history, art, music, travel, literature, domestic science, household economics, etc., are most numerous. Besides these many women's clubs co-operate in various ways with the municipal boards of cities, such as village improvement leagues, and organizations having for their purpose the study of sanitation, food, fuel, systematic charity, etc. A large number also is devoted to study alone, civics, music, industrial art, and child nature being among the most popular subjects.

Women's colleges all over the country have organized alumnae clubs having for their object the advancement of education among women. Professional clubs include organizations of teachers, nurses, lawyers, etc. Press clubs for women engaged in literary work are established in all the large cities, the Professional Woman's League of New York being one of the strongest. Patriotic clubs, such as the Daughters of the American Revolution, secure the perpetuation of the memory of the men who fought for independence. The Woman's Christian Temperance Union is a large organization aiming to reach and help in social, religious, and material ways, women of all classes.

As to the good that women's clubs accomplish there can be little doubt. Many business women's clubs loan money to their members in time of illness or sudden emergency; the negro women's clubs have been strong educational factors in the South,

Wood, Leonard (1860-), an American administrator and major-general. He was born in Winchester, New Hampshire, was graduated from the Harvard Medical School, and entered the army in 1885 as assistant surgeon. With Theodore Roosevelt he organized the Rough Riders on the outbreak of the Spanish War. He was made major-general in 1898, and was military governor of Cuba from 1899 to 1902. During his administration he attempted extensive improvement of the sanitary conditions in Cuba, and removed the large amounts of infectious material, introduced cleanliness and sanitary water supplies, and is thought to have secured permanent banishment of yellow fever. He introduced the public school system and in 1902 there were 4,000 schools and an enrollment of over 250,000. His attention was also directed to improved judiciary administration and general social reform. In 1903,

despite his want of military training and the presence of veteran officers to whom the promotion would be extended by right, he was made major-general of the regular army by President Roosevelt as a recognition of merit and efficiency.

While he was Chief of Staff, 1910 to 1914, General Wood established the military training camps for college students, and the citizens' training camps. During the Great War he was assigned the duty of organizing several large training camps. In 1919 he was transferred to the command of the Central Department with headquarters at Fort Sheridan, Illinois. He was Republican candidate for president in 1920, but was defeated by Senator Harding. Soon after his inauguration, President Harding commissioned General Wood to make a tour of the Philippine Islands to ascertain their fitness for independence. Refusing the position of provost of the University of Pennsylvania, he remained in the Philippines as governor-general.

Wood Alcohol. See ALCOHOL.

Woodbine. See HONEYSUCKLE; VIRGINIA CREEPER.

Woodchuck or **Ground Hog,** an American member of the ground squirrel family, found from Hudson Bay to South Carolina. The woodchuck is heavily built with flabby, pouchy body and short legs fitted for digging. It is about eighteen inches long with blackish or grizzled fur above and chestnut fur beneath. It lives in settled communities, digging large burrows, preferably under a stone or beneath a wall. Woodchucks feed upon growing field crops and are very destructive to young clover, beans and cabbages. Farmers consider them a pest, but in most communities they persist, notwithstanding the efforts made to destroy them.

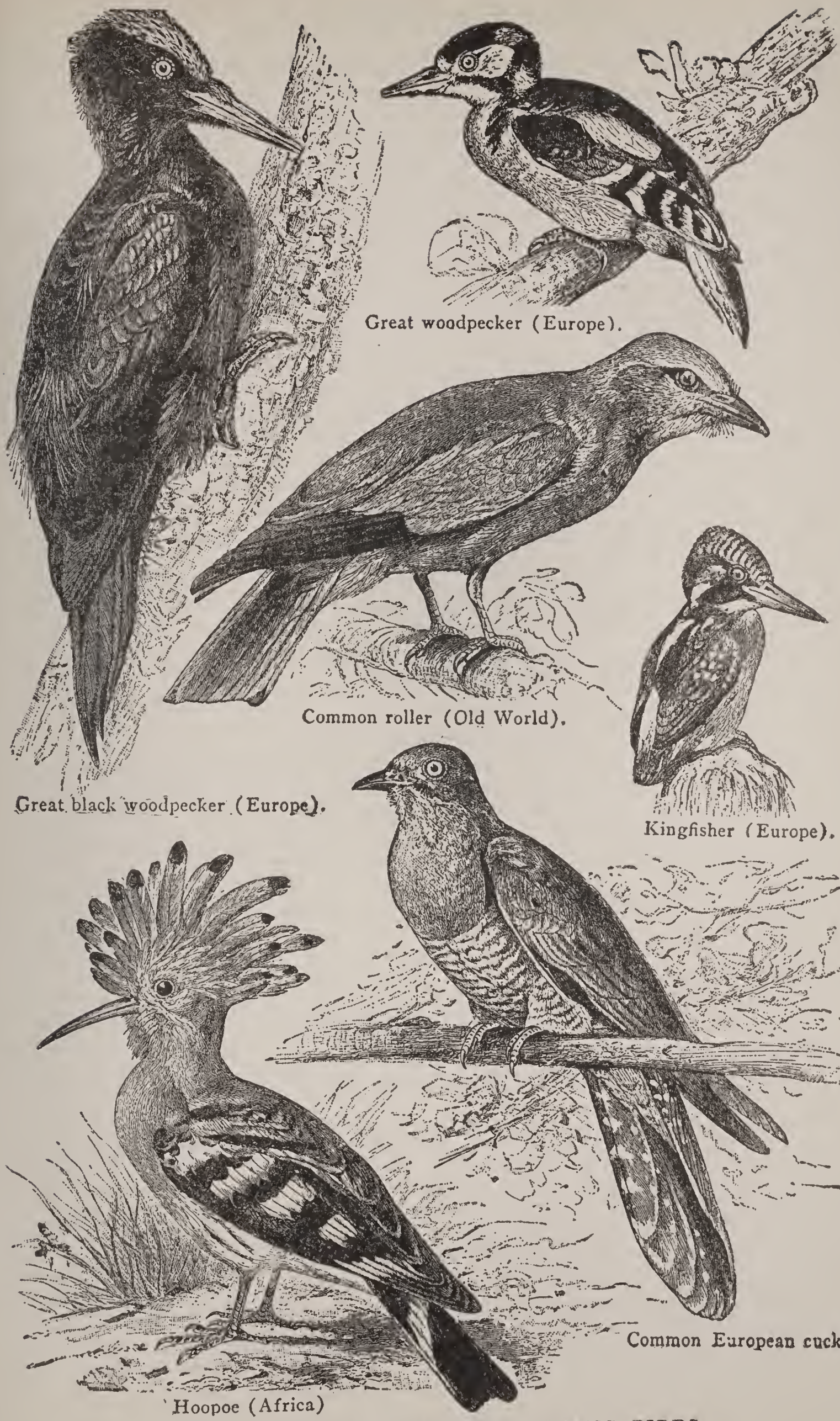
In the autumn the woodchuck puts on a layer of fat. About November he goes to sleep in his underground burrow below the limit of frost. In New England February 2d is called groundhog day. On this date the groundhog, so the saying runs, comes out and looks about. If he can see his shadow he retires and takes a six weeks' nap. A bright groundhog day betokens a late, wintry spring.

See MARMOT; PRAIRIE DOG; CHIPMUNK.

Woodcock, a game bird of the snipe family. The American species winters from the Ohio Valley southward to the Gulf. It nests in summer northward to Manitoba. It is a stoutly built bird about eleven inches in length, dark above and buff beneath. The female lays four buffy, rufous-spotted eggs in a leafy nest on the ground in the woods. The woodcock feeds at night, assisted, no doubt, by prominent button-like eyes. It has a long, slender bill, flexible and sensitive at the end like a finger, with which it probes rich, moist soil for earthworms. The woodcock is reluctant to take flight. When flushed it rises ten or twelve feet with a sudden spring, and drops plump into the undergrowth again. Sportsmen find it a difficult bird to bag. The European woodcock is a somewhat larger bird. It is found from England to Japan. Chambers is authority for a statement, to be found elsewhere as well, that the woodcock transports her young, one at a time, to feeding grounds by clasping it tightly between her thighs. In his boyhood Shakespeare was evidently familiar with this bird in the woods of the Avon, for in Hamlet he speaks of "springes to catch woodcock."

The American woodcock is the oddest looking land bird in North America. Its legs are too short for so large a body, its tail is only half as long as it should be, its neck is too short and too thick, and its head is entirely out of drawing. The eyes are placed too far back, and the bill is too long and too straight. In appearance, the woodcock looks like an avian caricature.—W. T. Hornaday.

Woodpecker, a family of climbing birds. There are about three hundred species. Woodpeckers are found in all forests save those of Australia and Madagascar. North America has twenty-five species. The woodpecker has a foot designed for climbing. Two toes with sharp claws point forward and two toes, save in a single genus, point backward. With the aid of stiff tail feathers as a brace, it can climb the tallest tree or cling to the under side of a branch, large or small, with perfect safety. The bill is straight and sharp, and is shaped like a chisel or wedge. The muscles of the neck are strong and active. By hammering with the bill the stronger species can drill



Great woodpecker (Europe).

Common roller (Old World).

Great black woodpecker (Europe).

Kingfisher (Europe).

Common European cuckoo.

Hoopoe (Africa)

WOODPECKER AND OTHER CLIMBING BIRDS.

a hole in any dry tree in the forest. The typical woodpecker locates a grub in an old tree, either by listening or inspecting, then drills a hole until the grub is uncovered, when a long, sticky tongue is darted in and the captive insect is transferred to the crop of the mechanic in the twinkling of an eye. It is a bird of very great economic importance, and in the western states it is protected by especially stringent laws because of the service it renders in preserving the forests from insect pests.

The high-hole, yellowhammer, or flicker, as it is locally called, is satisfied with berries, insects, and grain obtained more after the manner of sparrows. Ants are its favorite food. The red-headed woodpecker, frequently at least, passes the breeding season in catching caterpillars from vines for the support of self and family. Ants, wasps, beetles, grasshoppers, crickets, moths, caterpillars, spiders, strawberries, cherries, and seeds serve for variety. The yellow-bellied sapsucker drills holes in the bark of trees and sips the sap. The ivory-billed woodpecker, now restricted to the Gulf States, is a magnificent black fellow, twenty inches long, with a scarlet crest and white stripes running from the eyes to the middle of the back. The hairy and the downy woodpeckers look enough alike to be twins. They follow up the ants and the grubs pretty assiduously. They are familiar in orchards and dooryards. The arctic woodpecker of the northern pines has only one hind toe. The pileated woodpecker, with a scarlet crested head, a white breast, and a dark back, is a fine bird seventeen inches long. It was once common in the forests of North America but is retiring with the receding forests.

Woodpeckers nest usually in holes of their own drilling in old stumps or partially decayed trees. The American species lay from four to nine uniformly white eggs. The rolling tattoo of the woodpecker is produced by drumming with the bill on a dead limb. It is the call of the male to its mate. The sapsucker, the flicker, and red-headed woodpecker go south in winter. Other species range for food, but cannot be said to migrate.

The red-headed woodpecker of California drills holes in the bark of the pine tree and drives in acorns so tightly that the jay cannot get them out. The Spaniards called it the carpenter. It is supposed that these acorns are drilled in to serve as breeding places for the larvae of insects on which the woodpecker feasts later in the year. Some say the woodpecker, like the jay, stores the acorn for the sake of the kernel itself.

See FLICKER.

Wood Pewee, a shy forest bird of the flycatcher family. It resembles the olive-sided flycatcher. The upper parts are a dark olive; the wings and tail are fuscous; the wing coverts are barred with white; the under parts are white or yellowish. The upper mandible is black, the lower yellowish. The bird is nearly seven inches long. The wings are longer than the tail. Three or four white eggs with a wreath of umber markings about the larger end are deposited in a neat, shallow nest of fine grasses and rootlets, saddled on a limb from thirty to forty feet above the ground. The nest is composed partly of lichens to make it look like a knot. The wood pewee nests from Florida to Manitoba and winters southward. It is related closely to the phoebe or pewee; but, unlike the latter, which builds in bridges, barns, and other structures of man, the wood pewee hies itself to the deepest woods. It is an inhabitant of the tree-tops, where it catches the insects that live at a similar height.

His pensive, gentle ways are voiced by his sad, sweet call. The notes are as musical and restful, as much a part of Nature's hymn, as the soft humming of a brook. All day long the pewee sings; even when the heat of summer silences more vigorous birds and the midday sun sends light-shafts to the ferns, the clear, sympathetic notes of the retiring songster come from the green canopy overhead, in perfect harmony with the peace and stillness of the hour.—Chapman.

I quit the search, and sat me down
Beside the brook, irresolute,
And watched a little bird in suit
Of somber olive, soft and brown,
Perched in the maple branches, mute;
With greenish gold its vest was fringed,
Its tiny cap was ebon-tinged,
With ivory pale its wings were barred,
And its dark eyes were tender-starred.
"Dear bird," I said, "what is thy name?"
And thrice the mournful answer came,
So faint and far, and yet so near,—
"Pe-wee! pe-wee! peer!"

—Trowbridge.

Woodstock, New Brunswick, the county town of Carleton County, is on the west bank of the St. John River at the point where it receives the waters of the Meduxnekeag, and is on the Canadian National and Canadian Pacific railroads. The city is about 65 miles northwest of Fredericton. There are manufactories of leather, lumber, barrels, flour and grist, foundry and machine shop products, dairy products and pork. Hemlock, spruce and cedar are cut in the forests nearby.

Woodstock has an agricultural college, a school of domestic science, the county grammar school, Fisher Memorial School, a library, a hospital and a park. The water system is municipally owned and operated. The population was 4,000 in 1921.

Woodstock, Ontario, an important industrial city and the county town of Oxford County, is situated at the junction of Cedar Creek and the Thames River and is on the Grand Trunk and Canadian Pacific railroads, 51 miles northwest of Hamilton and 25 miles east of London. The city has a number of manufacturing plants in which are made such diverse articles as organs, pipe organs, pianos, metal signs, knitted underwear and stockings, woolen and cotton goods, paper packing and shipping devices, concrete working machinery, sewage tile, woven wire fence, fence tubing, stoves, wagons, all kinds of garden tools, bed springs, furniture, furniture castors, braid, curtain rods, flour, grist and other articles. The surrounding country furnishes cattle, wool, hides, hogs and grain, cheese and butter.

Woodstock is one of the most beautiful cities in Ontario; the streets are broad and paved and are especially well shaded. There are five public schools, a library, a Roman Catholic college, a commercial college, a collegiate institute, an armory and a hospital. In 1921 the population was 9,935.

Wool, the fine, soft hair which forms the coat of the sheep and similar animals. Wool is the second in importance of textile fibers, cotton standing first. The coat of wool shorn from a sheep at one time, usually one year's growth, is called a fleece. A fleece remains intact when taken from the animal, because the fibers are entangled naturally to a degree sufficient to hold it together. At the mill the fleece is unrolled by the sorter, who separates it into from six to twelve parts or grades. The finest wool is from the shoulders of the animal. The average weight of a fleece is from five to ten pounds. The heaviest recorded American fleece was taken from a Kansas ram and weighed fifty-two pounds. In scouring, wool loses about one-third of its weight. Scouring, rinsing, and drying are performed by machinery. This cleansing process leaves the wool harsh and wiry, and, as a certain degree of pliability is necessary for carding and spinning, it is subjected to a shower of lard oil or olive oil or of both, delivered in a fine spray. If burs, leaves, or seeds are entangled with the fiber, they must be removed. This is done sometimes by a mechanical process whereby the burs are beaten until they break and the pieces fall out. Another method is that of burning out the foreign matter by means of acids and a high degree of heat. Vegetable matter is entirely "carbonized," or reduced to a crisp, while the wool, being an animal substance, remains uninjured. The wool is then ready for carding and spinning. Commercially wool is divided into three classes, as follows:

1. Clothing wool, also called carding wool. This is the short fiber and is carded and spun without combing.
2. Combing wool, the long stapled wool, from four to ten inches in length.
3. Carpet and knitting wools, which are long, strong, and very coarse.

The basis of this classification is the length, fineness and felting qualities of the wool, and in breeding sheep for their wool the breeder has one, two or all of these properties in view.

Merino sheep bear very fine wool, but it is seldom more than two inches long; while the eight or ten inch wool of the Lincoln breed is coarser. From these two examples of different kinds of wool on different breeds of animals, it is plain that persistent cross breeding results in combinations of qualities. Wool from different parts of the body of the same sheep also presents differences of quality, the best coming from the shoulders, the poorest from the hindquarters.

The manufacture of woolen goods began

with the pastoral peoples of the East, spreading westward along the north coast of the Mediterranean Sea. The Merino sheep of Spain produce such fine wool that that country was for some years one of the leading woolen manufacturing countries of the world. Later, the industry gained ground in England, there reaching its largest proportions. For several centuries the finest woolens used in the United States were imported from England, but the American industry is now well established.

As indicating the proportions of those American industries for which wool is the raw material, the following figures from the industrial census of 1920 are interesting:

1.	Wool Pulling:	
	Number of establishments ..	24
	Capital invested	$8,853,437
	Operatives	705
	Raw material used.....	$12,809,592
	Value of product	$17,361,231
2.	Wool Scouring:	
	Number of establishments...	33
	Capital invested	$10,049,960
	Operatives	2,177
	Raw material used	$7,228,850
	Value of product.....	$13,679,584
3.	Wool Shoddy:	
	Number of establishments..	78
	Capital invested	$16,990,722
	Operatives	2,566
	Raw material used.....	$16,076,315
	Value of product	$23,254,398
4.	Woolen and Worsted Goods:	
	Number of establishments..	852
	Capital invested	$831,694,748
	Operatives	166,787
	Raw material used	$665,594,683
	Value of product.....	$1,065,434,072

See SHEEP; FELT; WORSTED.

Woolsack, in British history, a cushion stuffed with wool on which the lord chancellor sits in the House of Lords. It is a large square bag of wool. The seat is without back or arms. It is covered with green cloth. In his *Essay on Warren Hastings* Macaulay says: "He was then called to the bar, was informed from the woolsack that the lords had acquitted him, and was solemnly discharged." In his *Dictionary of Phrase and Fable* Brewer makes the seemingly fanciful statement that an act of Parliament was passed in the reign of Queen Elizabeth to forbid the exportation of wool, and that woolsacks were provided as seats for the judges in the House of Peers in order that this source of national wealth might be kept in mind.

Woolsey, Sarah Chauncey (1845-), American author, better .known by her pseudonym of Susan Coolidge. She has written stories and poems for children as well as books for older people. *What Katy Did* and *What Katy Did at School* are among her most popular stories.

Woolsey, Theodore Dwight (1801-1889), an eminent American educator and university president, was born in New York City. After graduation from Yale University in 1820, he spent a year in legal study in Philadelphia, and two years in theological study at Princeton College. Dr. Woolsey spent a short period as a tutor at Yale, and then went to Europe to study Greek. After holding the chair of Greek at Yale University from 1831 to 1846, Dr. Woolsey was chosen president of that institution in the latter year, and was ordained in the Congregational ministry. He left Greek to other and younger men, and devoted most of his time to instruction in history, political science, political economy and international law. During his administration, Yale University advanced in wealth and influence, and the Scientific School and the School of Fine Arts were established.

Resigning as president in 1871, Dr. Woolsey continued for a time to lecture on international law. For ten years, he was chairman of the American Commission for the Revision of the Authorized Version of the Bible. He was a lifetime member of the Oriental Society, and was for a time regent of the Smithsonian Institution. Chief among his publications are editions of the *Alcestis* of Euripides, the *Antigone* of Sophocles, the *Prometheus* of Aeschylus. the *Electra* of Sophocles and the *Gorgias* of Plato. Other works are a *Manual of Political Ethics, Religion of the Present and Future, Introduction to the Study of International Law, Communism and Socialism* and *Essays on Divorce and Divorce Legislation.*

Wool Sorter's Disease, a sort of blood poisoning, to which handlers of wool, alpaca, mohair, and similar substances are subject. Pustules appear on the arms. Death sometimes follows. The disease is thought to be due to a rod-shaped bacillus or bacterium known to medical men as anthrax. Sometimes the germs rise in the

dust from the wool and are taken into the lungs. The rapid development of the poison often causes death. The germs may be killed by subjecting wool to heat for several hours, or by disinfecting it. Wool handlers may also be rendered immune by inoculation.

Woonsocket, the third city of Rhode Island, is on the Blackstone River and on the New York, New Haven & Hartford Railroad, 16 miles north by west of Providence. The interests of the city are primarily industrial, and there are factories for the production of cotton and woolen goods, general rubber goods, wringing machines, hosiery, knit goods, shoes, and foundry and machine shop products.

The city buildings, post office, Y.M.C.A., Harris Institute Library, high school, Sacred Heart College and three parks are prominent features of the city. Woonsocket was settled in 1666, and was chartered as a city in 1888. In 1920 the population was 43,496.

Worcester, wōōster, the capital of Worcestershire, England. It is situated on the Severn. It was an ancient British settlement and a Roman military station. The last two syllables, "cester," are from the Latin word *castrum,* meaning camp. The final battle of the Engish civil war was fought here in 1651. The Scotch adherents of the Stuarts were defeated decisively by the English Puritans under Cromwell. The city is noted in industrial history for manufactures of gloves, porcelain, Worcestershire sauce, and vinegar. It is the center of a large trade in hops. The city is noted also for a thirteenth century cathedral with handsome windows and a square central tower. The interior is described as possessing a certain simplicity and majesty of its own. The city is less than half as large as its namesake, Worcester, Massachusetts.

Worcester, in Massachusetts, one of the county seats of Worcester County, on the Blackstone River, forty miles from Boston. It is an important manufacturing center both in number and variety of manufactured articles. Its wire mills are the largest in the world. Other large industries are the boot and shoe factories, the envelope establishments, and the woolen goods mills. Musical instruments, printing and publishing products, lumber products, leather goods, and food stuffs represent only a small part of the largest industries of the city. It has ten public parks. The principal buildings are the city hall, the courthouse, the state armory, Mechanics' Hall, the art museum, the State Insane Asylum, the Young Men's and Young Women's Christian Association buildings, the buildings of the American Antiquarian Society, and that of the Worcester Society of Antiquity, together with those of several charitable institutions, hospitals, and churches. The educational institutions are Clark University, the Worcester Polytechnic Institute, the College of the Holy Cross, the Worcester Academy, the Highland Military Academy, Becker's Business College, Kimball's School for Girls, and a state normal school. It was incorporated in 1722. In 1920 the population was 179,754.

Wordsworth, wûrdz'wurth, **William** (1770-1850), one of the greatest English poets. He was born at Cockermouth, England. As a boy he was strong-willed, headstrong, impulsive, and conceited. He left the University of Cambridge in 1791 after receiving the degree of bachelor. He spent several months in France, being in sympathy with the doctrine of democracy which was then advocated by the French Revolutionists. In 1797, with his only sister, Dorothy, he moved to Alfoxden in Somersetshire to be near Coleridge. Although Wordsworth and Coleridge were very unlike in character, they became intimate friends, and in 1798 *Lyrical Ballads,* their joint work, was published. In 1802 Wordsworth married his cousin, Mary Hutchinson, who had been a close friend since childhood. In 1814 his great poem, *The Excursion,* was published, and later *Peter Bell, The White Doe of Rylstone,* and *Sonnets on the River Duddon* appeared. Other principal works were *Memorials of a Tour on the Continent, Ecclesastical Sonnets,* and *Yarrow Revisited, and Other Poems.* The University of Oxford conferred on him the honorary degree of D. C. L. in 1839, and four years later, on the death of Southey, he succeeded to the laureateship.

Wordsworth was rightfully called "The Poet of Nature and Man." "To him nature was alive, not a mere dead mechanism." He believed that it was able to communicate with man. He did not present nature truthfully in all respects, however, for he always described the beauty and brightness, never darkness or cruelty. This characteristic is manifest in these lines from *Ode on the Intimations of Immortality:*

The cataracts blow their trumpets from the steep;
No more shall grief of mine the season wrong.
I hear the echoes through the mountains throng,
The winds come to me from the fields of sleep,
And all the earth is gay;
Land and sea
Give themselves up to jollity.

In his poems little of the artificial and conventional style used by earlier poets was apparent. He wrote in a simple, natural way, presenting his characters as peasants and shepherds, not as kings and courtiers after the custom of his predecessors. His lyrics are exceedingly musical and pretty, setting forth with an exquisite touch the beauties of nature in every form. The charming simplicity and sprightliness of his verse is shown in the following stanza from his little poem *To the Daffodil:*

I wandered lonely as a cloud
That floats on high o'er vales and hills,
When all at once I saw a crowd,
A host of golden daffodils,—
Beside the lake, beneath the trees,
Fluttering, dancing in the breeze.

His great love of nature is expressed in the following lines, the keynote of the beauty of the flower poems of this "high priest of nature:"

To me the meanest flower that blows can give
Thoughts that do often lie too deep for tears.

Coleridge once said to Wordsworth, "Since Milton I know of no poet with so many felicities and unforgettable lines and stanzas as you." Having thus observed Wordsworth's merits, it may be stated in all fairness that he is a writer of unequal performance. Much of his poetry is confessedly mediocre, and so obscures his finer poems and passages that Wordsworth is not so popularly known as he otherwise would be. See LAKE SCHOOL.

Workhouse, a house in which paupers live at the expense of the public. In the United States it is a correctional institution, and it was originally so in England, though the term is now applied in general to the poorhouse. Among the inmates, the able-bodied are compelled to work, being employed according to their ability. Secular and religious instruction are given, misconduct penalizes the offender and subjects him to additional labor. A register of the religious creed of every inmate is required, and restrictions are placed on their liberty to such an extent that they are denied the privileges of coming and going at will. See PAUPERISM; POOR LAWS.

Worm. See EARTHWORM.

Worms, a city of Hesse, Germany. It is situated on the left bank of the Rhine between Manheim and Mainz, in the center of a rich wine-producing region. It was originally a town of the Celts, then a Roman stronghold. Later it became the capital of the kingdom of Burgundy. It is famous in literature in connection with the Nibelungenlied. From the time of Charlemagne onward Worms was a frequent royal residence and was the seat of many imperial diets. The famous Diet of Worms, before which Luther defended his doctrines, was held in 1521. A monument commemorating the event is one of the principal outdoor ornaments of the city. It stands on a massive platform about fifty feet square and nine feet high. In the center stands Luther, a commanding figure of bronze about eleven feet in height. The edges of the platform are occupied by smaller statues of Huss, Savonarola, Wyclif, Peter Waldo, and others, including Melanchthon and Frederick the Wise. During the Middle Ages Worms was one of the most important towns in Germany. The chief building is the Cathedral of Worms, a Roman edifice begun in 1110. It has four erect towers, two domes, and a double choir. The ground plan is rectangular in form. The Jewish synagogue is the oldest place of Hebrew worship in Europe. In the time of Frederick Barbarossa the city contained 70,000 inhabitants. The present population is about 44,300. Aside from being the center of a rich agricultural district, the present industries are manufactures of tobacco, beer, soap, amber wares, etc. See LUTHER.

Wormwood. See ARTEMISIA; ABSINTHE.

Worsted, yarn or thread spun from long-stapled wool which has been combed. The yarn is soft and smooth, but is twisted harder in spinning than is yarn which is carded only. The latter is known as woolen yarn. In former times, an important distinction was made between "worsteds," that is to say, fabrics woven from worsted yarns, and "cloths," or fabrics woven from woolen yarns. Owing to advancement in methods of manufacture, this distinction is no longer of special significance, and the word worsted is used with various loose meanings. Technically, worsted yarn is distinguished from woolen yarn by being combed. As commonly used, the specific meaning of the word worsted is yarn for knitting and fancy work, which is smooth, being made from combed wool; whereas woolen yarn, spun from short wool that has been carded only, is rougher and more hairy since the fibers project in all directions from the body of the yarn. See WOOL; SPINNING.

Wren, rĕn, a group of short, excitable birds related to the catbird, the brown thrasher, and the mockingbird. There are five species in North America. The common house wren is the most intimate of all wild birds. It prefers to nest in a bird house and will occupy any old shoe, gourd, jug, box, or other receptacle put on a pole or lodged in the fork of a tree. Failing to find a home prepared, it will seek a crevice in a cornice, a hole in a wall, or a knothole in a rail, post, or log. A hole the size of a silver quarter is just right for a doorway. The common house wren is brown above with a crimson or olive tinge, and with grayish white under parts. This wren carries its short tail straight up in the air and jerks it incessantly. In singing it raises its head, drops its tail, and quivers with energy. In making a nest the amount of apparently needless material gathered is limited only by the size of the cavity. It lays six to eight wine-colored eggs; the total length of the bird is about five inches. It is found throughout eastern North America. The European house wren is well known as Jenny Wren in juvenile literature. The golden-crested wren of England is so small that seventy-two of them weigh only a pound. In France the motherly little house wren is undisturbed. It is called "little king" and "God's little hen." An old Scottish verse runs:

> Malisons, malisons, mair than ten,
> That harry the Ladye of Heaven's hen.

The diminutive house wren frequents barns and gardens, and particularly old orchards in which the trees are partially decayed. He makes his nest in a hollow branch where perhaps a woodpecker had a domicile the year before, but he is a pugnacious character, and if he happens to fancy one of the boxes that are put up for bluebirds, he does not hesitate to take it. He is usually not slow to avail himself of boxes, gourds, tin cans, or empty jars placed for his accommodation.

As regards food habits, the house wren is entirely beneficial. Practically, he may be said to live upon animal food alone, for an examination of fifty-two stomachs showed that ninety-eight per cent of the contents was made up of insects or their allies, and only two per cent was vegetable food, including bits of grass and similar matter, evidently taken by accident with the insects. Half of this food consisted of grasshoppers and beetles; the remainder of caterpillars, bugs, and spiders. As the house wren is a prolific breeder, frequently rearing in a season from twelve to sixteen young, a family of these birds must cause considerable reduction in the number of insects in a garden. Wrens are industrious foragers, searching every tree, shrub, or vine for caterpillars, examining every post and rail of the fence, and every cranny in the wall for insects or spiders.—F. E. L. Beals.

Wren, Sir Christopher (1632-1723), the architect of St. Paul's Cathedral, London. He was educated at Oxford. In his young manhood he wrote treatises on trigonometry and algebra, gaining for himself membership in the Philosophical Society at London. He sat in Parliament. While preparing plans in 1663 for the restoration of St. Paul's Cathedral, the building was destroyed by fire. He had the honor of planning and of completing the present structure, considered by many one of the great buildings of the world. Although he was the architect of other buildings, notably the library at Trinity College and the campanile of Christ's Church at Oxford, his name is connected chiefly with St. Paul's. He appears to have traveled in France but not in Italy. He was buried under the choir of the cathedral. The choir entrance bears a Latin inscription which may be

translated as follows: "Beneath is laid the builder of this church and city, Christopher Wren, who lived above ninety years, not for himself, but for the public good. Reader, if thou seekest his monument, look about thee." See ST. PAUL'S.

Wrestling. See ATHLETICS.

Wright, Carroll Davidson (1840-1909), an American economist and sociologist. He was born in Dunbarton, New Hampshire, received a secondary education, studied law, and became colonel of the 14th New Hampshire volunteers in the Civil War. He represented Massachusetts in the state senate in 1872, and from 1873 to 1888 he was chief of the state bureau of labor statistics. He was United States commissioner of labor between the years 1885 and 1902. He lectured as honorary professor in the Catholic University of America, and in the Columbian University in Washington. He was made president of the collegiate department of Clark University in 1902, and president of the American Statistical Association in 1903. He was recorder of the commission that arbitrated in the United States Anthracite Strike of 1902, and in 1906 Italy conferred on him the order of SS. Maurizio e Lazzaro in recognition of his high rank as a statistician and political economist. He has written *The Industrial Evolution of the United States* and *Outlines of Practical Sociology.*

Wright, Harold Bell (1872—), an American novelist, was born at Rome, N.Y., and educated in the common schools. Mr. Wright worked as a painter and decorator from 1887 until 1892, and earned a livelihood as a painter of landscapes from 1892 until 1897. During these years he studied for the ministry, and was ordained in the Christian Disciples Church in 1897. From that year until 1908 he held pastorates in various mid-western and western cities. After entering the ministry Mr. Wright began writing novels, the first of which, *The Printer of Udell's,* was published in 1903. Some of his books have become very popular. A list of his novels includes *The Shepherd of the Hills, The Calling of Dan Matthews, The Uncrowned King, The Winning of Barbara Worth, Their Yesterday, The Eyes of the World, Hidden Things, When a Man's a Man, The Re-Creation of Brian Kent* and *Helen of the Old House.*

Wright, Orville (1871-), and **Wilbur** (1867-1912), brothers, American inventors, famous for their construction of the aeroplane. Orville was born at Dayton, Ohio, and Wilbur at Millville, Indiana. They built the first heavier-than-air machine. This was demonstrated in Europe and Amercia, and attracted the attention of all the nations of the world. The Wright brothers are credited with having done more than anyone else towards making the aeroplane practicable for use in war, for travel and for sport. Among numerous other recognitions of their achievement a gold medal was awarded them by the French Academy of Sciences in 1909.

The machine consists of two planes placed about six feet apart and measuring about forty feet in length by six feet in width. The two planes are connected by uprights and are mounted on runners that extend out in front about ten feet. There is both a horizontal and a vertical motion to the rudder so that the operator can move the machine in either direction. The power plant is composed of a four-cylinder, water-cooled motor of thirty horsepower, which drives two propellers about eight and one-half feet in diameter. The construction and use of these large propellers is one of the reasons for the efficiency of the Wright machine.

Their first flight was made on December 17, 1908, from Kitty Hawk, North Carolina. Since that time the construction of their aeroplanes has remained practically the same, which bears evidence of how thoroughly the machine was thought out before construction and flight were undertaken.

Writs of Assistance, in Colonial history, general search warrants issued in 1761. The writs grew out of the difficulty experienced by the British custom house authorities in preventing smuggling into American ports. England was keen not only to prevent the importation of manufacturing machinery into the colonies, but to require the colonists to buy British goods only. In

order to have some check on receipts of merchandise and to know what was going on, the British government placed nominal duties on goods imported into the colonies, and British custom officers were stationed at American seaports to collect the duties and prevent smuggling, especially the bringing in of goods from countries other than Great Britain. These officers spent about $35,000 a year in collecting $10,000 of customs and were unable to put a stop to smuggling. The British Lords of Trade fell back on a statute passed during the reign of Charles II and directed their American agents to apply to the courts for writs of assistance, or general search warrants, authorizing them to search ships, warehouses, and homes indiscriminately. On the first application to the court at Boston, James Otis, a fiery young lawyer, was retained to oppose the issuance of the writs. This he did in a brilliant plea in which he urged that the act of Parliament in question was unconstitutional: "Reason and the constitution are both against this writ. . . All precedents are under the control of the principles of law. . . No acts of Parliament can establish such a writ. . . An act against the constitution is void." This was a novel plea. Otis boldly denied the supremacy of Parliament. Nowadays the courts of the United States do not hesitate to declare a legislative act unconstitutional and void, but in that day the doctrine was new. The court took the application under consideration and subsequently issued the writs desired. It does not appear, however, that the writs were used. An officer endeavoring to make use of so obnoxious a document would have been mobbed. The controversy divided the colonists into a royal party and a colonial party. See SEARCH WARRANT; OTIS.

Wryneck, a climbing bird allied to the woodpeckers. It takes its name from the peculiar manner in which it customarily twists the neck and turns the head or eye. There are several species. The common wryneck of Europe has toes like those of the woodpecker, two pointing forward and two pointing backward. The bill is straight and hard, suitable for rapping on the bark of trees. The tongue is long, and is capable of being extended to snap up insects. The wryneck nests in Northern Europe and migrates to southern climes for the winter. In England it goes by a number of common names, as cuckoo's fool, long-tongue, emmet hunter, cuckoo's messenger, and the like. Although a climber and in other respects quite like the woodpecker the wryneck does not use its tail as a prop.

Würtemberg, formerly a kingdom of Germany. It lies between Baden and Bavaria and touches the Lake of Constance. Area, 7,528 square miles, about equal to that of New Jersey. The surface is for the greater part hilly. The soil is chiefly of limestone formation. About a third of the country is forested with beech, birch, oak, and pine. The chief mineral productions are iron, salt, limestone, gypsum, slate, millstone, and potter's clay. The sheltered hillsides are favorable to the growth of the grape. Wine is an important product. The valleys produce wheat, rye, oats, barley, orchard fruits, hops, tobacco, and garden vegetables. The large manufacturing establishments produce cotton and woolen cloth, beer, and chemicals. The peasantry live in small villages and are skillful in the making of dolls, wooden toys, cuckoo clocks, and musical instruments. Würtemberg was raised from a duchy to a kingdom by Napoleon. The Congress of Vienna confirmed the arrangement. In the war of 1866 the kingdom took the side of Austria and was punished. In 1870-1 it sided with Prussia and became a member of the newly organized Germany Empire. Since the Great War Würtemberg has been merely a state of Germany, entitled to no more nor less privilege than the new constitution allows to other states of the republic. The national university is at Tübingen. The capital is Stuttgart, chiefly noted for its great library and as a publishing centre. The population of Würtemberg in 1921 was 2,526,171.

See STUTTGART.

Wu Ting-Fang (1842-1922), a Chinese lawyer and diplomat, was born in Singapore, Straits Settlements. Entering St. Paul's College, Hongkong, in 1855, Wu remained there until 1862, when he entered the colonial government service as a court

interpreter. He went to London in 1874 and studied for the law at Lincoln's Inn. Three years later he was called to the bar. He returned to Hongkong as a barrister; but, his abilities coming to the attention of the government, he was called north to become a member of the official staff of Li Hung Chang, Grand Chancellor of the Empire. As a member of the peace commission, Wu assisted in negotiating the treaty of Shimonoseki at the conclusion of the Chinese-Japanese War. Returning to Peking, he was successively appointed vice-president of the Imperial Clan Court, senior vice president of the Board of War, and superintendent of Imperial Railways. In 1896 began his long service as minister to the United States. In this capacity, he labored unsuccessfully against the reenactment of the Chinese Exclusion Act. Recalled to China in 1902 to assist in making commercial treaties with the United States and other countries, Wu was again minister to the United States in 1908-09, and in 1912. His abilities as a diplomat were so marked that he was made a member of the permanent Court of Arbitration at The Hague.

Wyandotte Cave, a natural cavern. It is an underground washout in the limestone rock of Crawford County, Indiana. Its passages have been explored for a distance of twenty-three miles. One chamber is 200 feet high and 300 broad. This cave ranks next to Mammoth Cave in size and interest. See MAMMOTH CAVE.

Wyandotte, Mich., important for its manufactures of salt products, is on the Detroit River and on the Michigan Central, Lake Shore & Michigan Southern and other railroads, 12 miles south-southwest of Detroit. An extensive and valuable deposit of salt is worked near the city, and salt blocks, lye, soda ash, bicarbonate of soda and caustic soda are leading manufactures. Other products of Wyandotte's factories are ships, boats, gasoline engines, chemicals, fur coats and rugs, motor trucks, wagons, trunks and bags.

The public schools, public library, post office and Eilbert Memorial Hospital are the most notable buildings. The city was settled in 1854 and was incorporated as a city in 1867. Population, 1920, 13,851.

Wyatt, Sir Thomas (1503-1542), an English poet. He was born at Kent. He was graduated from Cambridge in 1518. After traveling on the continent he returned to England where he was well received at court owing to the influence of his father, who had been in favor with Henry VII and was none the less so with Henry VIII. Wyatt's wit and poetic gifts, his polished manners and many accomplishments, made him well fitted to succeed. He was, moreover, a man of skill in the management of affairs, as well as of the strictest integrity. He was intrusted with several diplomatic missions by Henry VIII and was knighted by him in 1536. Wyatt was a student of foreign literature and had cultivated the art of verse making from his youth. His name is associated with that of Henry Howard, Earl of Surrey, in connection with the sonnet, a form of poetry which these two poets are said to have brought to England from Italy. Wyatt's poems were not published during his lifetime. In *Tottel's Miscellany,* published in 1557, ninety-six poems are assigned to him. Thirty-one sonnets by Wyatt are extant.

Wycherly, William (1640-1716), an English dramatist. He was a native of Shropshire. He was educated in France and at Oxford University, expecting to practice law. He gave little attention to his profession, however, being fond of a gay life of fashion. His first comedy, *Love in a Wood,* was published in 1671. Others were *The Gentleman Dancing-master, The Country Wife,* and *The Plain Dealer.* The last named secured him a pension from James II. While Wycherly's comedies won him considerable fame, they are so low and vulgar as to be now considered almost unreadable.

Wyclif, wĭk'lĭf, **John** (1324-1384), an English reformer. He was the son of a country squire. He was educated at Oxford. He rose to a high position in the university and attacked the abuses of the church. He is called the earliest Protestant, "the Morning Star of the Reformation." Not satisfied with controversy in Latin, the language of the church and the law court, Wyclif appealed to the people in English. He is the first English pamphleteer, the first English university man to ad-

dress himself to the plowboy—to appeal to the people. Richard III drove him finally from Oxford to appease the friars and the clergy. Wyclif, with flowing robe, long gray beard, and piercing eye, retired, staff in hand, to a parish church, lived in a hovel, and forged a weapon against his enemies—nothing less than a translation of the Scriptures from the Latin into the language of the common people—the first English Bible, 1382. He died peacefully. Thirty years after his death the Council of Constance, the same that condemned John Huss, issued a decree that Wyclif's remains should be disinterred and burned. This was done, and his ashes were cast into a little brook that runs past Lutterworth into the Avon. The Avon leads into the Severn, and the Severn into Bristol Channel. The poetic fancy of Wordsworth makes the scattering of Wyclif's ashes symbolical of the spreading of his doctrine:

As thou these ashes, little brook, wilt bear
Into the Avon—Avon to the tide
Of Severn—Severn to the narrow seas—
Into main ocean they—this deed accurst,
An emblem yields to friends and enemies,
How the bold teacher's doctrine, sanctified
By truth, shall spread throughout the world dispersed.

Some prophet of that day said:

The Avon to the Severn runs,
The Severn to the sea;
And Wyclif's dust shall spread abroad
Wide as the waters be.

Wyclif's Bible did much in the entire absence of grammar, dictionary, and spelling book—that is, before their day—to fix the English language. Writers, however, could not turn to his Bible as we do to a dictionary, for it appeared before the invention of printing and copies had to be drawn off by hand. It was printed in 1850. The following verses from the first chapter of St. Mark give an idea of Wyclif's choice of words and spelling. We should remember that it preceded the King James Bible by two hundred years:

The voyce of oon cryinge in desert, Make ye redy the weye of the Lord, make ye his pathis rihtful.

And John was clothid with heeris of camelis, and a girdil of skyn abowte his leendis; and he oet locusts, and hony of the woode, and prechide, seyinge:

A strengere than I schal come aftir me, of whom I knelinge am not worthi for to vndo, or vnbynde, the thwong of his schoon.

I have baptisid you in water; forsothe he schal baptise you in the Holy Goost.

Wyoming, one of the mountain group of states, is commonly called "The Equality State," from its having always granted equal suffrage to men and women. The state has an area of 97,914 square miles—320 square miles being water—and is bounded by Montana on the north; South Dakota and Nebraska on the east; Colorado and Utah on the south; and Utah, Idaho and Montana on the west. In outline, however, Wyoming is rectangular.

The People. By the fourteenth census the population of Wyoming was 194,402, or only 2.0 people to a square mile, in the latter respect standing second from the bottom of the list. Only 25,255 of the inhabitants were foreign born; the largest foreign born element came from England; the next largest from Sweden. The people of Wyoming are 29.5 per cent urban, but the largest city, Cheyenne, had only 13,829 residents in 1920. Casper had 11,477, Sheridan, 9,175; and Laramie, 6,301; no other city exceeded 5,000. Cheyenne is the capital.

Surface and Drainage. The general elevation is higher than that of any other state, making of Wyoming a vast elevated plateau intersected from southeast to northwest by two great ranges of the Rocky Mountains. The average elevation is 6,000 feet, and above the plateau some of the peaks rise for additional thousands of feet. Just west of the southeast corner of the state the Laramie Range enters; this extends northwestwardly, then swings west, and finally turns north, entering Montana as the Big Horn Range. The second chain crosses the southern boundary farther west as the Medicine Bow and Sierra Madre ranges, which are separated by the North Platte River valley; the highest peak is Fremont, 13,790 feet; this is in the western quarter of the state and midway between the northern and southern borders. In the extreme northwestern corner is Yellowstone National Park (which see).

There are six large rivers—the Green, North Platte, Belle Fourche, Powder, Big

Horn and Snake. The Green rises south of Fremont Peak and flows south by east, entering Utah near the Colorado border. All of the southeastern quarter is drained by the North Platte and its large affluent, the Sweetwater. The Belle Fourche rises in the northeastern border of the state and flows northeast, almost reaching the Montana line before swinging into South Dakota as the North Fork of the Cheyenne River. Powder River rises near the geographic center of the state and flows north by east into Montana. The Big Horn headwaters are a short distance east of Fremont Peak; the stream flows southeastward for some miles and then bends almost due north, entering Montana west of the center of the state line. Snake River rises in the southern end of Yellowstone Park, flows south, and swings around the southern end of the Teton Range into Idaho. Yellowstone, Shoshone and Jackson lakes, all in the northwest, are the largest bodies of water in Wyoming.

CLIMATE. Extremes of heat and cold are met with in the state, but in general the climate is dry and healthful. The mean annual temperature is between 60° and 65° F. The rainfall averages but 13 inches, and except along the rivers irrigation is necessary for agriculture. More than 1,200,000 acres are irrigated now, (1923), and additional thousands of acres will continually be added to this total.

MINERALS. The potential mineral wealth of the state has not been estimated, but it is known to be great. Petroleum is first in point of value, and the petroleum industry has grown and is growing very rapidly. Coal is next in importance, and is followed by gold, silver and copper, iron, building stone, gypsum, graphite, phosphate and, in small quantities, precious stones. One of the chief needs of the mining industry is proper transportation facilities.

AGRICULTURE. The annual value of Wyoming's crops is $50.000.000. Hay and forage crops are first in importance, but are closely followed by wheat, potatoes, oats and corn. Barley and rye are also grown, and apples, plums and cherries are successfully cultivated.

Stock raising is the most important branch of agriculture, however. The state is the second sheep raiser in the Union, with an annual wool clip well in excess of 25,000,000 pounds. Large herds of horses and cattle are pastured in the grass lands at the bases of the mountains, and the raising of swine is increasing in importance.

FORESTS. The United States Department of Agriculture gives 3,600,000 as the state's forest acreage. Lodge pole, white and yellow pine and Douglas fir are the principal stands; and in the foothills grow willow, ash, scrub oak and juniper.

MANUFACTURE. Save for refined petroleum, the output of Wyoming's 576 manufactories is largely for home consumption. Lumber products, dairy products, flour and grist and railway cars are the only other manufactures that have even slightly more than local importance.

TRANSPORTATION. None of the rivers is navigable, and though the state is eighth in size, it has but 1,924 miles of railroads. The principal roads are the Union Pacific, Northern Pacific, Chicago & Northwestern and the Chicago, Burlington & Quincy.

CHARITIES AND CORRECTIONS. Wyoming's public institutions are supervised by a state board of charities and reform. The institutions are the State Industrial School, the penitentiary, State Hospital for the Insane, Wyoming Soldiers' and Sailors' Home, Wyoming State Training School, Big Horn Hot Springs Reserve, general hospital and the State Home for Dependent Children.

EDUCATION. Wyoming has always been at the front in educational matters, and in 1920 the illiterates comprised but 2.1 per cent of the total population. In 1920 there were 1,477 public graded and 88 public high schools, and connected with the University of Wyoming is the state normal school and agricultural college.

The university was founded at Laramie in 1886. It offers courses in liberal arts, music, education, agriculture, engineering, commerce, home economics and university extension, and a summer school is maintained. At the latest date for which statistics are available the institution had 60 instructors and 1,200 students.

GOVERNMENT. Wyoming is governed under the constitution of 1889. This instrument provides for a senate of 25 members and a house of representatives of 54 members. Senators are elected for four years, representatives for two years.

The governor, secretary of state, treasurer, auditor, attorney-general and superintendent of public instruction are the executive officers, all of these serving for four years.

The judiciary is composed of a supreme court of one chief justice and two associate justices, and inferior courts such as may be from time to time established.

HISTORY. The first half of the eighteenth century is the period usually given for the first exploration by a white man of the present Wyoming, though no definite year can be assigned. The country around Yellowstone Park was explored by a fur trader, John Colter, in 1807; but it was not until 1834 that the first settlement Fort Williams, later Fort Laramie, was made. The eastern part of the state was included in the Louisiana Purchase, and became a part of Missouri Territory in 1812. The western half of the state was formerly included in the territories of Oregon and Washington; and other large or small parts of the state were later successively included in the territories of Idaho and Dakota. Settlement was impeded by the somewhat hostile aspect of the land and by the depredations of the Sioux and Cheyenne Indians, who were not quelled until 1876. The Union Pacific Railroad built through the state in 1866, and in 1868 the Territory of Wyoming was organized. The territory became a state in 1890. More railroads and irrigation extension aided in the early development of the state and will greatly assist its future development.

STATISTICS. The following statistics are the latest to be had from trustworthy sources:

Land area, square miles	97,594
Water area, square miles	320
Forest area, acres	3,600,000
Irrigated area, acres	1,207,982
Population (1920)	194 402
White	190,146
Negro	1,375
Indian	1,538
Asiatic	1,343
Chief cities:	
Cheyenne	13,829
Casper	11,477
Sheridan	9,175
Number of counties	22
Members of state senate	25
Members of house of representatives	54
Salary of governor	$6,000
Representatives in Congress	3
Assessed valuation of property	$298,538,152
Bonded indebtedness	$1,935,000
Farm area, acres	11,809,351
Improved land, acres	2,102.055
Oats, bushels	4,500.000
Wheat, bushels	3.424,000
Potatoes, bushels	2,052.000
Corn, bushels	1,232.000
Hay, tons	1,423,000
Wool, pounds	28,422,000
Domestic animals:	
Horses	189 000
Milk, cows	80.000
Other cattle	720.000
Sheep	3,040,000
Swine	57,000
Manufacturing establishments	576
Capital invested	$82,287,667
Operatives	6 634
Raw material used	$42.250.528
Output of manufactures	$81 445 394
Coal, long tons	6.607 000
Petroleum, barrels (42 gals.)	16,500,000
Gold, value	$1,276.000
Silver, value	$24,292
Miles of railway	1,924
Teachers in public schools	2,232
Pupils enrolled	47,653

X

Xanthippe, zan-thĭp′ē, the wife of Socrates. She is celebrated in literature for a shrewish temper. Many ancedotes, very probably the products of Athenian wit, are told of the scolding Xanthippe and her good-natured, shiftless husband. It was a standing amusement in Athens to tell the latest story about Xanthippe. To an anxious, unappreciative wife, Socrates might easily appear a thriftless, lounging fellow, who took little pains to provide his family with the necessities of life. On one occasion it is said Xanthippe followed up a vigorous tirade on his general worthlessness by sousing him with a pail of water. The only effect on the philosopher was to draw out a remark to the effect that, in her case, at least, thunder was a sure sign of rain. Whatever the facts relative to the social relations of the family and the wife's temper may be, Xanthippe has become a proverbial name for a scolding wife. See SOCRATES.

Xavier, zăv′ĭ-ẽr, **Saint Francis** (1506-1552), a Jesuit missionary. He was born in the Castle of Xavier, Navarre. After he was graduated from the University of Paris, he joined his fellow student, Ignatius Loyola, and together they founded the Society of Jesus in 1534. He spent the rest of his life as a missionary. His apostolic journeys were lengthy and complicated. He established missions throughout every principality of Hindustan, won vast numbers in Japan, and intended to convert China to Christianity, but died on reaching the border of the Empire. He exerted a tremendous influence over those with whom he came in contact. He preached for ten years, and in that time is said to have baptized 1,000,000 persons, and to have preached the Gospel in fifty-two kingdoms, and in over 9,000 miles of territory. He was canonized in 1622. See JESUITS; LOYOLA.

Xenophanes, ze-nŏf′a-nēz (570-480 B. C.), a Greek philosopher. He was born at Colophon, Asia Minor. He was banished from the city and settled finally at Elea in Lower Italy. Here he founded the Eleatic school of philosophy of which Zeno was a distinguished member. Xenophanes and his friends may be regarded as Grecian Unitarians. He attacked the mythology of Homer and Hesiod, declaring that these poets ascribed actions to the gods that would disgrace any man. The fragments of his scientific writings that remain show that the world had scientific leaders 2,000 years before it had people sufficiently intelligent to follow them. In physics, he taught that earth and water are the elements of all created things. He held that the stars were fiery clouds. In geology, he believed that the fossils of sea animals found in the marble quarries of Syracuse, and even high up on the mountains, were to be explained by the theory that the surface of the earth had been subject to alternate elevation and subsidence.

Xenophon, zĕn′o-fọn (434-355 B. C.), a Greek historian and general. He was a native of Athens, a disciple of Socrates. He followed his teacher to war, and his life was saved by Socrates in the battle of Delium, 424 B. C. He was a member of the expedition of Cyrus the Younger in 401. After the battle of Cunaxa and murder of the Greek generals he led the 10,000 Greeks in their march to the Black Sea. Later he wrote an account of this expedition, known in literature as the *Anabasis.* He engaged in other military operations and acquired considerable wealth. For siding with the Spartans he was banished from Athens. Though subsequently permitted to return, he is said to have died at Corinth. His chief writings are the *Anabasis,* describing the march of the ten thousand; the *Memorabilia* or recollections of Socrates; the *Cyropaedia,* an alleged life of Cyrus the Elder; and the *Symposium,* an imaginary banquet at which Socrates is made to talk. He also wrote several works on war, hunting, agriculture, and politics. His style is simple and interesting. Greek critics called him the "Attic Muse."

The following quotation from Xenophon shows that division of labor was a live topic in his time: "In small cities the man who makes beds may make doors, plows, tables,

and perhaps houses. He is glad, if, even so, he can find customers enough to provide a living; and it is plainly impossible that a man practicing many crafts should be good at them all. But in great cities, because there is a large demand for each article, a single craft is enough for a living, or sometimes, indeed, no more than a single branch of a craft. We find one man making men's boots only; and another women's only. One man lives by cutting garments; another by fitting together the pieces, the smaller, the greater the skill in the craftsman."

Xerxes, zẽrks'eez (519-465 B. C.), a king of Persia. He was the son of Darius. He ascended the throne in 485. He is the Ahasuerus of the book of Esther. In 480 B. C. he invaded Greece with the greatest army of antiquity. The historians of the day declare that it contained 1,000,000 men. He crossed the Hellespont in 480 B. C. by means of a bridge of boats, forced the pass of Thermopylae, and burned Athens. He lost the battle of Salamis and fled back to Persia, lest his retreat should be cut off by the destruction of his bridge. See THERMOPYLAE; SALAMIS; HELLESPONT.

X-Rays, or **Roentgen Rays,** a form of radiant energy akin to light and electricity. They were discovered in 1895-96 by Wilhelm Roentgen, at that time a professor in the University of Würzburg. The discovery won him the Nobel prize for physics in 1901. Roentgen found that, in addition to the streamer of colored light produced by the passage of a high tension electrical current through a vacuum, other rays are produced. They cannot be seen by the eye, but they produce the same effect on a sensitive photographic plate that is produced by ordinary light. Moreover, these rays pass through aluminum and wood more readily than through glass, through flesh more readily than through bone, and through bone more readily than through lead or steel. If a hand in which a bullet or needle has lodged be interposed between the X-rays and the screen, the whole hand will cast a shadow, but the bones will cast a darker shadow than the flesh, and the bullet or needle will cast a darker shadow than the bones. In this way, the surgeon is able to locate a bullet and to examine the knitting of a fractured arm, rib, or leg. Tumors may be traced, the location of the heart noted, etc.

X-rays pass in straight lines through all substances. Thus far no way has been found of turning them from their course, or of bringing them to a focus. They have a marked physiological effect. While they cannot be seen, they yet have a certain irritating effect on the retina or else some part of the lining of the eye.

RADIOTHERAPY. The use of X-rays in treating certain diseases such as tumor, cancer and other malignant growths has given rise to a distinct branch of medicine to which some specialists devote their entire time. Growths on or near the surface of the body are frequently checked by X-rays, but those beneath the surface are more difficult to reach and require a stronger current and rays of shorter wave length. Cancer is seldom if ever cured by the treatment, although the growth may for a time be checked.

See CROOKES; CANCER; FINSEN; NOBEL.

X Y Z Papers, the papers sent as correspondence in 1797-98 to the United States government by the three commissioners to France, John Marshall, Charles Pinckney, and Elbridge Gerry. These commissioners were attempting a settlement of international difficulties, but they were not recognized by the French Directory, and the agents with whom they communicated demanded a large sum of money in order that the Directory might be pacified. The American commissioners submitted their report to President Adams, and when he presented the matter to Congress he designated the signers of the dispatches with the letters X Y Z. A hostile attitude was assumed by the United States at once, and war on the sea broke out, but the French government hastened to settle matters amicably.

Y

Yacht, yŏt, a pleasure boat. The word is of Dutch origin, from *yagen,* to chase, and means a swift hunting vessel. The term is applied to a variety of ships propelled by wind, steam, or electricity. The term is somewhat indefinite. A yacht may be used for racing, cruising, or exploring, but not for carrying passengers or freight. Some yachts designed for inland waters are little larger than skiffs. Others, like the royal yacht of the emperor of Germany, are built for seagoing service. The word appears to have been introduced into England in connection with a boat given by the Dutch to Charles II in 1660.

In England and the United States fortunes are spent each year on yacht construction, yacht racing and yacht club maintenance, and yacht racing has become an international pastime.

The first great international yacht race was held in 1851, when the *America* crossed the Atlantic to accept the challenge for a race of 60 miles around the Isle of Wight. The *America* won the race, and the cup that was the prize was set aside by the *America's* owner as an international trophy. The next international race, held in 1870, was also won by an American boat, the *Magic.* In a race held in 1903 the English entry was lost in a fog and the contest was declared "no race." No English boat won the international trophy until 1920. In a race held on July 15 of this year the American entry was disabled and the English boat, *Shamrock IV,* won. Four more races were run in July, 1920; in one the boats failed to finish within the six hour limit, and the American entry, *Resolute,* won the other three from *Shamrock IV.*

Shorter and less widely heralded races are annually held in English waters and on the Atlantic coast of the United States and on the Great Lakes. The Lipton cup is probably the best known of all yachting trophies. (See LIPTON, THOMAS).

Yak, yăk, the black wild ox of Thibet, sometimes called the grunting ox. The yak is native in the high altitudes of Central Asia. Nature has draped this animal with long hair reaching from the sides almost to the ground, resembling in this respect its relative, the musk ox of Arctic latitudes. Naturalists have not failed to point out that cold weather, due to altitude, has done for the yak what similar conditions, due to latitude, have done for the musk ox. The yak is about four feet high. It carries a pair of fine ox-like horns. It has long been domesticated by the Thibetans among whom it is the principal beast of burden. The yak furnishes excellent beef, milk, and butter, also. Its long, silky hair is woven into clothing. Its back is slightly humped, like the American bison. The yak's tail was an emblem of authority among the Orientals. The yak is stubborn, but it is more serviceable than the horse or camel for snowy, mountain work. In conducting military operations in that region, the British have found it convenient to employ the yak not only in packing baggage, but as a riding animal. See CAMEL; REINDEER.

Yakutsk, yä-kōōtsk′, the capital of the Siberian province of that name. It is situated near the central point in the course of the Lena at about sixty-two degrees of north latitude. The name is derived from the native inhabitants, Mongolian people known as Yakuts. During the short summer season Yakutsk is a trading town. The exports are chiefly gold, furs, and the ivory of the mammoth. The population is about 5,000. See SIBERIA; MAMMOTH.

Yale University, a noted institution of learning at New Haven, Connecticut. It grew out of the original impulse which founded New Haven colony. In 1701 a royal charter was obtained for the collegiate school of Connecticut to be governed by ten Congregational ministers and their successors. The first legal location was the town of Saybrook, but the first classes were taught by Abraham Pierson in the neighboring village of Killingworth. In 171[illegible] town of Saybrook, but the first classes were taught by Abraham Pierson in the neighboring village of Killingworth. In 1716

the school was removed to New Haven. Elihu Yale, a wealthy East Indian merchant, whose father was one of the original settlers of New Haven, gave the college a collection of books and various sums of money, in all $3,000, then a large sum. In 1718 the name was changed to Yale College in his honor.

Connecticut has treated Yale from the first much as though it were a state university. In 1792 a grant of $30,000 was made. The governor, lieutenant-governor, and six state senators were made members of the corporation—the governing body. In 1872 the six senators were displaced by six members chosen by the alumni. In 1887 the name was changed to Yale University.

The University is organized into nine departments:

The College, which is the center about which the other departments are grouped and which offers courses leading to the degree of Bachelor of Arts.

The Sheffield Scientific School, which maintains courses in mathematics and physical and natural sciences. It maintains a graduate and an undergraduate department.

The Graduate School, which confers the degrees of Doctor of Philosophy and Master of Arts.

The Medical School; the School of Law with graduate and undergraduate departments; the School of Religion, undenominational; the School of Fine Arts; the School of Music; and the School of Forestry.

The faculty numbers 575 and the enrollment is about 4,000. The graduates include persons distinguished in every walk of life.

See DWIGHT, TIMOTHY; PORTER, NOAH.

Yam, a twining shrub of the East and West Indies. There are several species. The yam is allied to smilax and the lily family. The large, fleshy, tuberous roots are full of starch and are much used for food. The original of the cultivated species is supposed to be the winged yam of the South Sea Islands, whose roots reach a length of thirty inches and a weight of twenty-five or even one hundred pounds. The "yam" of the Southern States is a kind of sweet potato. A genuine wild yam is found in the eastern part of North America. The twining stems of the yam climb over thickets and hang out panicles and racemes of pale, greenish-yellow flowers. The leaves are heart-shaped.

Yancey, yăn'sĭ, William Lowndes (1814-1863), an American statesman. He was born in Hancock County, Georgia, and died at Montgomery, Alabama. He was descended from Virginian and New England families of standing. He was prepared for the law. He came into national notice as a congressman from Alabama in 1844. Yancey was one of the most determined, talented, and uncompromising, but not farseeing, advocates that American slavery has ever had. At the close of the Mexican War he demanded that the treaty should provide for slaveholding in the territory acquired by the war. As early as 1850 he urged Alabama to secede from the Union. Yancey was a man of fiery eloquence. In the Baltimore convention of 1860 he was the acknowledged leader of the Southern Democracy. Under his influence Alabama took the lead in secession. Yancey was the leader of secession. Yancey, not Jefferson Davis, was the logical candidate for the presidency of the Confederacy. Yancey desired to gain European recognition and moral support by entering into commercial treaties with France, Great Britain, and Germany, whereby the Confederacy would agree for twenty years to ship cotton and receive manufactured goods free from duties. He urged also the immediate purchase of guns and ammunition before the Federal government could blockade the Southern ports effectually. He was a member of the Confederate Senate. He considered Jefferson Davis an inefficient man. Yancey lived long enough to see that the course which he had urged his neighbors to take had led to the destruction of slavery and the temporary ruin of Southern homes and prosperity.

Yang-tse-Kiang, yăng-tsē-kĭ-äng', the great river of China. The name is Chinese, meaning son-of-the-sea. This river rises in central Tibet, winds through stupendous gorges and magnificent scenery, until finally it tumbles over numerous waterfalls, then traverses the great tea region of China,

and enters the eastern sea north of Shanghai. Its total course is about 3,000 miles in length. British warships have sailed up the river for about 800 miles. In season, a tidal wave follows up the river to a point over 400 miles from the sea. There are numerous large cities on its banks. The plain surrounding the lower course is one of the most fertile and densely-populated in the world. It is united with that of the Hoang-Ho by the Great Canal. See CHINA; SHANGHAI; HOANG-HO.

Yankee, a native of New England. The Yankees are descended for the most part from British ancestry. The name is said to be a corruption of a name given to the early colonists by the Massachusetts Indians. During the Civil War the Confederates called the Northern soldiers Yankees, regardless of the regiments to which they belonged. Europeans extend the word to include inhabitants of the United States.

Yankee Doodle, a popular air now considered one of the national tunes of the United States. It is said to have been borrowed by the Americans from England: that during the time of Cromwell the Oxford students sang derisively:

Nankee Doodle came to town
Upon a Kentish pony:
He stuck a feather in his hat
And called him Macaroni.

When the British troops were evacuating Boston, so one account runs, they sang this song in mockery, substituting "Yankee" for "Nankee." The Americans took up the air and have sung Yankee Doodle ever since.

Yap, a small island of the ,Pelew group in the northern Pacific Ocean, southwest of Guam and formerly belonging to Germany. The area is 79 square miles. Population, about 500. Yap is the junction point of important cable lines, one extending to Shanghai and the Far East and another through East India via Singapore to India. The mandatory of Yap was granted to Japan without the knowledge of the United States and without regard to the request of President Wilson at the Peace Conference, that the island be internationalized. The award was opposed by the United States, and the Secretary of State sent an identical note to the Allied Powers very clearly setting forth America's position. In February, 1922, the controversy was settled by treaty.

Yarrow, a celebrated stream of Selkirkshire, Scotland. It forms two beautiful lakes known as the Loch of the Lowes and St. Mary's Loch. It has a course of sixteen miles through Ettrick Forest, emptying into the Ettrick, near Selkirk. The braes of Yarrow are celebrated in literature. Sir Walter Scott was descended from Auld Watt and "his fair dame, the flower of Yarrow." Wordsworth made this stream the theme of three poems: *Yarrow Unvisited, Yarrow Visited,* and *Yarrow Revisited.*

Yarrow, or **Milfoil,** a hairy, erect roadside weed from Europe. It has a flat top of small white flowers. It belongs to the composite family. The leaves are soft and dusty, from two to four inches in length, and are cut into many fine segments. Yarrow is held in repute as a medicinal plant. Yarrow tea is an old household remedy for loss of appetite and for diarrhea. Tincture of yarrow used as an ointment, has a tanning, puckering effect like that of alum. It arrests bleeding. Yarrow plays its part in the folk-lore of Scotland. The lass desiring to see the face of her future husband puts yarrow under her pillow and repeats this rhyme before going to sleep:

Thou pretty look of Venus'-tree
Thy true name it is Yarrow;
Now who my bosom friend must be,
Pray tell thou me tomorrow.

Yates, Richard (1818-1873), an American political leader, the Civil War governor of Illinois. Born at Warsaw, Ky., he removed with his parents to Illinois in 1831, and was graduated from Illinois College in 1838. He began law practice in Springfield. Very soon Mr. Yates became a prominent political figure, and sat in the state legislature from 1842 to 1855. He was one of the founders of the Republican party, and by that party was elected governor of Illinois in 1860, serving until 1865. His loyalty and activity marked Mr. Yates as one of the greatest of the country's war governors, a man whose advice on many questions was sought by President Lincoln. Mr. Yates was elected to the United States Senate in 1865, serving until 1871.

Year, the length of time taken by the earth in making one revolution about the sun. The astronomical year is the time included between the two equinoxes. By rights the first day of the first month of the civil year should be the first day after the vernal equinox. March was the first month of the Roman year. September, October, November, and December, meaning the seventh, eighth, ninth, and tenth months, were actually such, reckoning from March as the first. Until 1752 the English year began March 25th. The year is actually 365 days, 5 hours, 48 minutes, and 45.5 seconds, a trifle less than 365¼ days, in length. To avoid fractions, each fourth year or leap year is assigned an extra day, so that we have three years of 365 days, followed by one year of 366 days. The leap years are those divisible by four as 1860, 1864, 1868, 1872, etc. The fraction is not quite a fourth of a year, so it has been agreed to skip a leap year a century three times out of four; in other words, that only such century years should be leap years as are divisible by 400. 1896 and 1904 are leap years, but 1900, not being divisible by 400, was passed by with 365 days. 1996, 2000, and 2004 will all be leap years as 2000 is divisible by 400. See CALENDAR.

Yeast, yēst, small plants creating fermentation. Yeast, as known to the housekeeper and the brewer, is simply a collection of small oval plants. The yeast plants are related to the molds, but are too small to be seen by the naked eye. They are more like bacteria, but are larger. In the household and in manufacturing, molds and bacteria are often harmful—ruinously so, but neither the breadmaker nor the brewer can get on without yeast.

Many yeasts are known to the botanist, but it is sufficient for our purpose to speak of yeast in the singular. The yeast plant is about $\frac{1}{2800}$ of an inch in diameter, and is an egg-shaped, transparent body without color. Under favorable conditions the plant, for we must get rid of the notion that a plant necessarily has a root, stem, branches, and leaves, absorbs nourishment through its walls and grows by budding or throwing out a sort of pocket which becomes a new plant. The new pouch sends out other pouches and so on, all in less time than it takes to describe the process, until, under the microscope, the whole irregular-shaped group or colony looks like a miniature cactus plant. After a while the joints drop apart, each a perfect yeast plant as at the start. Under certain circumstances, as when the yeast plants are grown with a scarcity of food, individuals divide within into grains or spores and become sacs of from two to four dry spores. The sac bursts and the spores are carried away and scattered by the wind. Under ordinary circumstances every breath we draw carries with it spores of yeast, as well as mold and bacteria.

Three stages of yeast growth are recognized:

1. Spores, or the spore-bearing state.
2. The budding or growing stage.
3. The rest stage in which individual plants lie at rest singly or in a mass, inactive for want of moisture, food, and warmth.

The cake of dry yeast sold in a grocery store is composed largely of millions of dry yeast plants in a state of rest. The liquid foaming yeast from the brewer contains millions of yeast plants actively budding. When deprived of most of its water and pressed into a soggy cake, it is sold as compressed yeast. Yeast requires sugar for food, although it cannot live upon pure sugar. The natural sugar solutions, such as molasses, fruit juices, and sirups, contain usually sufficient other material so that yeast will thrive in them. Too large a percentage of sugar, however, is injurious to yeast, hence fruit may be preserved from fermentation by cooking it with a large amount of sugar. "Pound for pound" is the old-fashioned rule for preserves which do not require to be sealed. With air-tight jars so much sugar is unnecessary. Bread dough contains sugar enough for yeast growth.

The flour of which bread is made contains a great deal of starch. When this is "wet up," as the housewife says, a chemical action takes place by which some of this starch is changed into sugar. When yeast is added to bread dough and is mixed in thoroughly, it attacks the sugar of the dough at once and multiplies with marvelous ra-

pidity. As the yeast feeds upon the materials in the dough, the sugar is fermented, producing carbon dioxide and alcohol. The carbon dioxide gas forms tiny bubbles in all parts of the dough, causing it to swell or rise, that is, to become light. When the bread is sufficiently light, it is baked. The action of heat drives off the alcohol which has been produced, swells the bubbles of gas, causing the bread to rise in the pan, but checks the rising process by hardening the dough into the firm texture of bread. Yeast thrives best, that is to say, bread rises best, at a moderately warm temperature of say from 75° to 90° F. At a higher temperature, bacteria are apt to sour the dough. If the temperature be below 75° the yeast will not act, that is, it will not grow rapidly. In long standing, bacteria are apt to sour the dough.

In like manner the brewer and distiller use yeast to convert the sugar of grain into the alcoholic portion of beers, whiskies, and into alcohol proper. Yeast is killed by a boiling temperature. Fermenting in fruit, jelly, or cider may be checked at once by boiling. The brewers and distillers are the largest users of yeast.

Freshly compressed yeast is composed in part of the following: sugar, cellulose, fat, glycerin, sodium, iron, lime, silica, potash, magnesia, organic acids, alcohol and other substances. Among these are many valuable food elements, for which reason compressed and dried yeast have come into use as a nitrogenous food of high value. In the wet and dried state it is also used as a medicine in the treatment of acne, diabetes, furunculosis, psoriasis and other disorders. See Molds; Bacterium; Bread; Brewing; Wine; Cider.

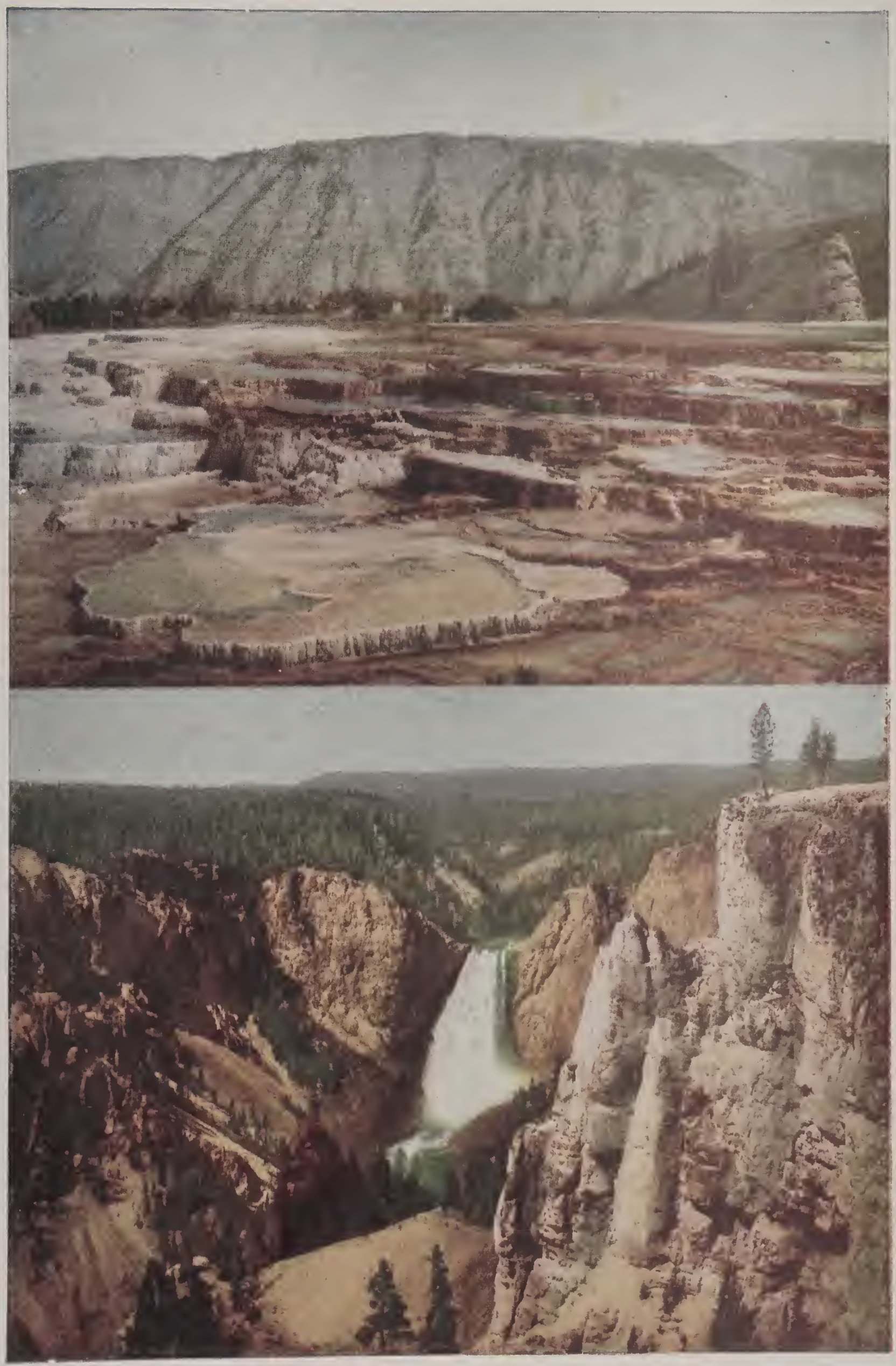
Yeats, William Butler (1865-), an Irish author. He was born in Sandymont, Dublin, and was sent to school at the age of nine. At fifteen he studied in the Erasmus Smith School in Dublin, and after some time he began to study painting at the Royal Dublin Society. His early writings were published in 1889, and the romantic note which prevailed in all his poetry suggested the first revival of recent interest in the Celtic movement. The romantic drama, *Countess Kathleen,* was published in 1892, and two years later his *Land of Heart's Desire* was staged. He became interested in the Irish Literary Theatre in 1900, and short romantic plays followed in rapid succession. Well-known ones are: *Cathleen in Houlihan, Where There is Nothing, Pot of Broth,* and *On Bailie's Strand.* Mr. Yeats owes something in inspiration and treatment of themes to Blake and Shelley, as well as to the Pre-Raphaelites, and has probably been influenced by Maeterlinck to some extent. He has found in the legends and life of his native country a wealth of material, and his treatment of it is poetic, simple, and real. His poetry is marked by an elusive charm and unusual musical qualities.

Yeddo. See Tokio.

Yellow, one of the primary colors. If light be decomposed by a prism, yellow may be found in the spectrum between the orange and green. Combined with blue it yields green; red and yellow produce orange. Yellow is a favorite color in nature. It is the color of the buttercup and of the harvest. Yellow silk is the garb of the Chinese mandarin of high rank.

Yellow Fever, an infectious disease peculiar to low, warm countries. It is a bacterial disease. The germs which were once thought to float in the air, it is now known are conveyed from the blood of one person to that of another through the agency of the yellow fever mosquito which breeds in low lands partly under water. After the mosquito has drawn blood from a fever patient it requires about twelve days for the germs to develop in the mosquito's body so as to be transferred by a mosquito bite to another person. Scientists go so far as to say that the fever can be transmitted in no other way. People who live in such countries become more or less hardened or immune, that is to say, the germs of the fever are not so likely to thrive in their blood as in that of strangers.

It has been found that one of the quickest and most effective methods of ridding swamp lands of the fever carrying mosquito is to spray all standing water with crude petroleum or its chemical equivalent so as to form a film over the water. This has been done in fever infested parts of



YELLOWSTONE PARK.

1. Hymen Terrace. 2. Falls of the Yellowstone.

the United States and in the Canal Zone, as well as in some Central and South American countries. The result has in all cases been a diminution of the disease. The most recent yellow fever campaigns were launched in Chile and Ecuador (1920-21), and the result has been very hopeful.

As in the case of smallpox and other infectious diseases, attempts have been made to inoculate against yellow fever, but without success. As a means of preventing the spread of the disease, yellow fever patients are surrounded by mosquito bars to keep the mosquitoes away. Most infectious diseases, as typhoid or cholera, spread more rapidly in unsanitary conditions, but filthy surroundings seem to have no effect on yellow fever, except as they further the breeding of mosquitoes. The entire problem seems to be one of exterminating or controlling this insect.

The geographical range of yellow fever is chiefly American, extending along the seacoast from Boston to Rio Janeiro, including the cities of the West Indies and Central America. It also extends up the Mississippi Valley as far as Memphis or St. Louis. It is believed that climatic conditions in other parts of the world would be favorable, if the mosquito and the germs were once established. Great pains are taken, therefore, to quarantine all ships and travelers from regions in which yellow fever is raging. The original home of yellow fever is believed to be the west coast of Africa, whence it was imported by the slave trade. The West Indies are the American center of the pestilence, whence it has been carried to the seaports of Spain and Portugal. An epidemic of yellow fever visited Philadelphia in 1793. Between August and the middle of September one person out of ten of the entire population died of the disease. Another serious invasion of the fever in the United States occurred in 1878 when over 15,000 deaths occurred in the lower Mississippi Valley. Since the Spanish-American War in Cuba in 1898 the danger of infection from Cuba has been considerably lessened owing to the thorough cleaning of the chief cities of the island by the Americans and their improved sanitary condition since. A frost hard enough to do up the mosquito never fails to stay the spread of yellow fever.

See MOSQUITO.

Yellowhammer. See WOODPECKER.

Yellow Sea, a gulf of the Pacific Ocean off the northeastern coast of China. It borders on the provinces of Chehkiang, Kiang-su, Shantung, and Chih-li. Its greatest breadth is 400 miles, its narrowest span about 115 miles, its length is 620 miles, and its depth shallow. The Korean archipelago bounds a part of its eastern coast. The Hwang-ho, or Yellow River, the Yang-tse-Kiang, and the Yalu River flow into it. They deposit large quantities of alluvium in the sea and color the water to a muddy lemon-yellow, whence it gets its name. This continual deposit by inflowing streams has caused the depth to decrease perceptibly.

Yellowstone National Park, a government reservation comprising 5,575 square miles. The park lies chiefly in Wyoming, but extends into Idaho and Montana. The first man to see and know any portion of what is now the Yellowstone Park was John Colter. Colter had been with Lewis and Clark at the mouth of the Columbia River, and on the return to Mandan, in 1806, severed his connection with these explorers and retraced his course to the head waters of the Yellowstone. During the summer of 1807 he traversed at least the eastern part of the Yellowstone Park country. The map in the Lewis and Clark report, published in 1814, shows "Colter's Route in 1807." The original park, enlarged in 1891, was set aside by Congress in 1872 as "a public pleasure ground and a game preserve." The park is surrounded by snow-clad ranges, known as the Shoshoni, the Big Game, and the Teton. The general elevation of the plateau is 7,800 feet. The surrounding peaks, as Index, Saddle Mount, and Sunlight, are from 10,000 to 12,000 feet in height. The highest peak within the park is the Sheridan, 10,385 feet high. The floor of the plateau is composed of a vast flow of lava. There are a number of extinct volcanic peaks but none are now active. The head waters of the Yellowstone, the Snake, the Lewis, the

Madison, and the Shoshoni lie within the park. The largest body of water is Yellowstone Lake. It is drained northward by the Yellowstone River. It flows for ten miles through Grand Cañon, the walls of which are in places 1,400 feet high. Yellowstone Falls are about 310 feet high.

The most singular scenic features of the park are geysers and hot springs. There are three separate geyser basins in the valley of what is known as Firehole River. The larger geysers have reecived individual names. The Giant and the Giantess have immense craters; the Bee Hive and Castle are so called on account of the shape of their cones. The Sawmill and the Lion have a roaring noise when in action. Old Faithful spouts steam and water at regular intervals of sixty-four minutes. He has not been known to vary. Hell's Half Acre is a crater of hissing steam. The Devil's Paint Pot is so called from the way in which the many colored clays of its basin change their hues. In places the hot waters of the springs flow from one huge cup to another arranged in the form of terraces.

The summits of the mountains are above the timber line; otherwise the park is covered with a growth of evergreen trees, chiefly black pine, spruce, and fir. There are many beautiful mountain flowers. The wild animals of the park are protected by law. None but guards are allowed to carry firearms. One of the few existing herds of buffalo is one of the attractions of the park. Other wild animals are antelopes, elk, various deer, mountain lions, the beaver, moose, mountain sheep, and both the black and the brown bear. The bears, being secure from molestation, become very familiar. Whenever one shows signs of becoming surly or dangerous he is killed by the guards. Fish are abundant in the lakes and streams.

Yellowstone Park is open to all the people. It may be entered by three gateways —Gardiner on the north, Yellowstone on the west and Cody on the east. Gardiner is on the border of the park and within five miles of Mammoth Hot Springs and Fort Yellowstone. No region in America has better roads than those in Yellowstone Park. All transportation is by automobile, and a trip including the principal points of interest will require a ride of about 150 miles and should occupy four or five days. First class hotels are located at Mammoth Hot Springs, Upper Geyser Basin, the Fountain and the Canyon. Transportation companies having permanent camps offer a less expensive but equally enjoyable tour. Private camping parties may pitch their own tents on designated camping grounds and take their own time in making the trip, but the inconveniences usually more than offset the advantages of such a trip.

The park is under the direct supervision of the Park Commissioner with headquarters at Fort Yellowstone. All tourists are required to register on entering the park and to deposit any guns they may have with the Commissioner. The rules forbid taking any mineral specimens or defacing in any way the formations. Grazing is not allowed, but camping parties may use fallen timber for fuel, provided they extinguish all fires on breaking camp. See GEYSER; PARK.

Yen, the unit of Japanese money. Accounts are kept in yens, sens, and rins. The yen is worth a trifle less than half a dollar of American money. The sen is the hundredth part of a yen and the rin is the tenth part of a sen. Gold is coined in twenty, ten, and five yen pieces; silver in fifty, twenty, and ten sen pieces; nickel in five sen pieces; and bronze coins in one sen and five rin pieces. The lowest coin, the five rin piece, is worth, therefore, $\frac{1}{200}$ of a yen, approximately one-fourth of a cent.

Yew, yū, an evergreen tree allied to the pines, but bearing red or bluish berry-like fruit instead of cones. Our northeastern yew is a trailing shrub, the California yew is a fair-sized tree forty to fifty feet high, and the Florida yew is a shrubby tree fifteen to twenty-five feet high. The Japanese yew has dark green foliage and red bark. The yew of history is a short-trunked, low-branching tree twenty to sixty feet in height. Its heart wood is orange red or brownish and has long been esteemed, especially the yew of Spain, for bows and fine cabinet work. The reader of *Ivanhoe* will recall that Isaac of York offers good

Diccon Bend-the-Bow or Locksley a hundred staves of Spanish yew to make bows if he will but keep silence about a certain vault where Isaac kept his money. The citizens of Frankfurt expended $2,000 to move a venerated yew tree to a place of safety in the city palm garden. This yew is reputed to be 400 years old. In the British Isles, the "venerable" yew is associated with walks and churchyards. Gray in his *Elegy* alludes to a fine specimen yet standing in the churchyard of Stoke Pogis. A number of English yew trees are 300 and 400 years old. Yew trees of half that age may be found in the first settled parts of North America. The yew tree is traditionally the special abhorrence of witches. See CEDAR; SEQUOIA.

Yokohama, yō-kō-hä′mä, the chief seaport of Japan. It is situated on the Bay of Yedo about seventeen miles southwest of Tokio. Tokio is the city of business. Yokohama is its port. Consuls and foreign merchants reside at Yokohama. It has an excellent harbor in which the merchant vessels of the world, as well as the naval squadrons of nations with which Japan is at peace, are allowed to anchor. Long breakwaters have been built. A railway connects the port with the capital. The population is estimated at over a third of a million. The imports, valued in a recent year at $45,000,000, consist chiefly of sugar, machinery, cotton and woolen goods, kerosene, and baled cotton. The exports, valued at $68,000,000, were chiefly cocoons, silks, coffee, tea, fish, paper and paper goods, fans, dolls, etc. Owing to the prevalence of earthquakes, the buildings are, for the most part, low and far from capacious. The natives reside in inexpensive wooden buildings worth a few dollars each. The furniture of a three-room house is worth about $25. Tourists visiting Japan land at Yokohama. See JAPAN; TOKIO.

Yonge, yŭng, **Charlotte M.** (1823-1901), an English writer. She was a native of Hampshire. In 1853 she won reputation as an author by the publication of a novel, *The Heir of Redclyffe.* Other works followed in rapid succession. The more noted are perhaps *The Prince and the Page,* and *The Dove in the Eagle's Nest.* She wrote also a number of manuals of history, including *A History of Germany, A History of France,* etc. She was a firm upholder of the Church of England.

Yonkers, a city in Westchester County, New York, on the Hudson River. It rises on terraces from the river and the highest part of the city commands a view up and down the Hudson, with its palisades, as well as of the valley stretching beyond. It is the home of wealthy New York business men. Chief among its manufactures are furniture, carpets, rugs, hats, patent medicines, and confectionery. The foundries, machine shops, coal yards, grain elevators, boat-building yards, and flour mills also represent a large part of the invested capital. The city has several hospitals, churches, and charity institutions. The "Greystone," Samuel J. Tilden's old home, is of historic interest. Lowden School, Halsted School, the Spencerian Business College, Saint Joseph's Seminary, and Mount Saint Vincent Academy are the principal educational institutions. It has a large public library, and the city hall is the old Philipse Manor House, built in 1752. The first settlement was made in 1650. In 1920 the population was 100,226

York, the capital of Yorkshire, England. It is situated in the fork of two small rivers, half way from London to Edinburgh. York was an ancient stronghold of the Romans. It was reached from London by a branch of Watling Street. Antiquarians have unearthed many Roman remains, including tombs bearing Latin inscriptions, statues, altars, fireplaces, tiles, vases, urns, bronze instruments, and ornaments of gold, silver, bronze, and jet. The emperor Severus is said to have died here in 210. Constantine the Great was commander of York at one time.

York was an early seat of English learning. It was the home of Alcuin, whom Charlemagne persuaded to come to Aix-la-Chapelle to teach his two children. The York library, that is to say, collection of manuscripts, was one of the most considerable in western Europe. It was destroyed by the Danes. York was the early center of Christianity in the north of England,

as was Canterbury in the south. In fact, the two archbishops of England are still known as archbishops of Canterbury and York. At the end of the Norman conquest York held out stubbornly until it is said 100,000 people had been put to the sword.

In 1921 York was a city of 84,052 people. It is still surrounded by massive stone walls three miles in circuit. The top of the wall is a favorite promenade. It commands a beautiful view of the surrounding country. The city has outgrown its walls. Communication is maintained by imposing gateways. They are somewhat in the way of traffic, but the citizens would not think for a moment of tearing them down.

When Richard Plantagenet, Duke of York, fell at the battle of Wakefield, the haughty Margaret of Anjou is said to have insolently given the order, "Off with his head, and set it on York gate, so York may overlook the town of York." The streets within are narrow and irregular in direction. A large portion of the city still consists of medieval houses with overhanging walls of antique appearance.

There are extensive manufactures of machinery, glass, beer, combs, gloves, leather, wall paper, and confectionery, but the interest of the traveler centers in the great York Minster, considered by many the greatest Gothic cathedral in existence. The first building on this site was erected by Edwin, king of Northumbria, in 627. The present building was begun in 1227. It was completed in 1470. The cathedral has the form of a Latin cross 524 feet in length and 250 feet in extreme width. It exceeds in size both St. Paul's cathedral and Westminster Abbey. A description of the great west front, with its rich moldings, sculptures, and massive towers, the nave and the transept, the choir, the chapter house, and the lantern tower would require a volume. When one enters the west door there opens before him a grand vista 500 feet in length and 100 feet in height. The marble pillars and the pointed, vaulted roof give the impression of a great forest aisle, bordered by magnificent trees, whose branches arch overhead to form the ceiling. At the farther end is the great east window, pronounced the finest specimen of stained glass in the world. It is seventy-five feet high and thirty-two feet wide. It consists of about 200 compartments or panes, each about a yard square and containing figures about two feet in height. The subjects are taken from the whole range of the Bible. There is also a circular window thirty feet in diameter, and many others, all of stained glass, beautiful beyond description. Even a brief visit to the cathedral and a view of the city and its walls render it easy to understand that York was at one time a center of wealth and authority, and all this at a time when London was a squalid village.

York, Pa., is a singularly out-standing industrial city. It has a greater proportion of its population gainfully employed than any other city in the state. It also has a greater variety of industries in proportion to its population. Although located near to the heart of industrial America, yet the city has kept its population pure, less than 3 per cent being of foreign birth.

York's variety of industry has not prevented the growth of several large plants to be world leaders in their line. Included among the products are refrigerating machinery, artificial teeth, bank safes and vaults, bakers' machinery, auto tire chains, water turbines and roofing paper.

York has been a pioneer in industrial education, having evolved a successful cooperative course in connection with the high school.

In 1777, the Continental Congress, fearing capture by Howe's Army, retreated from Philadelphia to York, and held sessions here from September 30, 1777, to June 27, 1778. In 1920 the population was 47,512.

Yorktown, the capital of York County, Virginia, situated on the York River fifty miles southeast of Richmond. The present population does not exceed 250 persons. Interest in Yorktown is entirely historical. In 1781 the British under Cornwallis were penned up here by the allied forces of the Americans and French, commanded by Washington and Lafayette respectively. A French fleet under the command of De Grasse prevented the escape of the British

by sea. October 19th the British army of 8,000 men surrendered to Washington, an event which virtually closed the Revolutionary War. During the Civil War Yorktown was a scene of struggles between the Confederates, who were defending the approach to Richmond most gallantly, and the Union forces led by George B. McClellan. See REVOLUTION.

Yosemite, yō-sĕm′ĭ-te, a scenic valley in California. It is situated on the western slope of the Sierra Nevada in Mariposa County, 150 miles easterly from San Francisco. The name is Indian, signifying a huge grizzly bear. The valley is one of the most remarkable gorges in the world. It is about seven miles long and from one-half a mile to a mile in width. The valley runs from east to west. Save at its lower end it is inclosed by granite walls from 3,000 to 5,000 feet high.

Tourists entering at the lower or western end find themselves between massive piles of rock. On the north, El Capitan, the captain, a huge block of granite, rises perpendicularly 3,300 feet. Across the entrance stand Cathedral Rock and Bridal Veil Rock. Other rock masses guarding the valley are known as Three Brothers, the Spires, Cap of Liberty, and Sentinel Rock. The vicinity is occupied by enormous elevations of rock, known from their kettle shape as North Dome, Sentinel Dome, Half Dome, etc. The valley itself contains forests of pine, cedar, fir, and California oak. There are small meadows brilliant with flowers in early summer. The Merced River enters the valley at its upper point. It pours over two successive precipices 600 and 400 feet high respectively. Some idea of these heights may be had by remembering that Niagara Falls are but 165 feet high. At various points snow-fed streams leap down into the valley to join the Merced. Bridal Veil, so-called from the breadth of the sheet in time of wind and melting snows, makes a leap of 630 feet and tumbles over 300 feet of additional cascade. Virgin's Tears falls 1,000 feet. Yosemite Creek, which gives its name to the valley, leaps 1,500 feet of sheer descent, descends 625 feet in a series of cascades, then passes over a second precipice 400 feet high. A half day's climb to Sentinel Dome or Glacier Point is rewarded by a magnificent panoramic view.

The Yosemite Valley and Falls were discovered in 1851 by a party of settlers and miners in pursuit of a band of marauding Indians. The latter took refuge here and were followed by the whites. In 1864 Congress granted the valley to California on condition that it be "held for public use, resort, and recreation," and that it be "inalienable for all time." The Yosemite may be reached most readily by a spur line of the Central Pacific terminating at Raymond. The rest of the trip is made by stage. For those who have time and who enjoy outdoor life, a more enjoyable method is that of traveling from Oakland by team with a camp outfit. The road leads through the famous Mariposa Grove of Big Trees. In 1890 the park was enlarged. The region is now known officially as Yosemite National Park, and is visited annually by thousands. See MUIR; SEQUOIA; NATIONAL PARKS.

Yoshihito (1879-), the one hundred and twenty-second emperor of Japan, was born at Tokio, the third son of Mutsu-Hito, the emperor who died in 1912. In childhood Yoshihito was physically weak, and was tutored privately. Two other sons of Mutsu-Hito having died in infancy, Yoshihito was proclaimed heir apparent in 1887. In that year he was enrolled at the Peers' School, and in 1889 was given the title of Imperial Crown Prince. After five years at the Peers' School he was given a lieutenancy in the imperial army, and two years later he left the school and studied at the royal palace under private instructors.

Though he became emperor at the death of his father in 1912, the formal coronation was postponed until 1914. Yoshihito spent years in the study of his country and his people, and is also learned in the arts and sciences of the western world. He is a liberal, democratic ruler whose prime purpose is the general advancement of his subjects.

Young, Brigham (1801-1877), the second president of the Church of Jesus Christ of Latter-day Saints, commonly known as the Mormon Church. He was

born at Whittingham, Vermont, June 1, 1801, and died in Salt Lake City, Utah, August 29, 1877. He was a practical artisan, having learned the trades of carpenter, painter, and glazier. He was a member of the Methodist church when, in 1830, he first saw a copy of the Book of Mormon. He was baptized into the Church of Jesus Christ of Latter-day Saints in April, 1832. When the Council of the Twelve Apostles was organized in 1835, he was ordained a member thereof; afterwards he became president of the Apostles, and still later he succeeded to the presidency of the church.

The pioneer band that entered what is now Utah and established settlements in the valley of the Great Salt Lake in 1847 was led by Brigham Young. Under his efficient direction the sagebrush wastes were converted into fruitful fields, and flourishing cities rose in the heart of the American Desert. He was preëminently a practical man, ever ready to lead in the material affairs incident to the development of a new country, as well as in matters spiritual. During his administration four temples were begun in Utah, and one of them completed.

When Brigham Young and his band of hardy pioneers entered the Salt Lake Valley in 1847, the region was under the sovereignty of Mexico. By the treaty of Guadalupe Hidalgo this western section passed to the United States, and in 1850 the Territory of Utah was organized. Brigham Young became the first governor and so remained for seven years. He proved himself a leader, a colonizer, and a statesman of signal ability. See UTAH; MORMONS; SALT LAKE CITY.

Young, Edward (1681-1765), an English writer. He wrote during the period made notable by such men as De Foe, Dryden, Addison, Pope, and Swift. His reputation rests chiefly on his *Night Thoughts*. It is a sombre, meditative poem. It was much in favor with the great-grandparents of the present generation, but now it is little read.

Young, Ella Flagg (1845-1919), an American educator. Ella Flag was born at Buffalo, New York, and was educated in the public schools of Chicago. She was graduated from the city high schools and the city training school for teachers. Miss Flagg began teaching in 1862. In 1868 she married William Young but did not cease her professional work. In 1887 Mrs. Young was made superintendent of one of the districts of Chicago. President Harper offered her a position in Chicago University, but Mrs. Young insisted on waiting until she had a suitable degree. In 1900 she won the degree of Ph. D. with honors in the University of Chicago and accepted the coveted professorship. In 1905 Mrs. Young was elected principal of the Chicago Normal School. In 1909 she was elected superintendent of the public schools of Chicago at a salary of $10,000 a year, the most responsible position and the highest salary ever awarded an American woman. She held the position nine years. At the 1910 session of the National Education Association held in Boston, Mrs. Young was elected president for the ensuing year.

Young Men's Christian Association, The, an organization for the promotion of the general welfare of men and boys—physical, moral, intellectual—is more popularly known as the Y. M. C. A., or the "Y." Race, creed or color are no bars to membership in the organization, though voting and office holding privileges are enjoyed only by members of an evangelical church.

At the outset, the Y. M. C. A. was chiefly religious in aim. In 1844 a Londoner named George Williams organized a small number of his fellow workers for religious worship and Bible study. Williams was a dry goods clerk, and his influence among his fellow clerks was so great that his organization grew rapidly, soon embracing men from many walks of life. By 1848 the society had a library and rest rooms in London, and in 1851 allied associations were established in Boston, Montreal and New York.

Before the third quarter of the century the Y. M. C. A. had branches in almost every large American, Canadian and English city and in 1866 the International Committee of the association was established in New York City. Handsome,

costly buildings containing libraries, gymnasia, reading rooms, social rooms, etc. were built in many cities; and large hotels, modern in all details and giving service at nominal rates, were established. At Springfield, Mass., and Chicago, Ill., the association now has colleges, and it maintains summer schools at several places in the United States. In Canada and England the growth has been similar to that in the United States, except that those countries have not as many special branches—for Indians, railroad employes, etc.—as has the latter country. Tokyo, Calcutta, Shanghai, Manila and other large foreign cities have Y. M. C. A.'s.

THE "Y" IN THE WORLD WAR. Never before in its history did the Y. M. C. A. conduct such varied and valuable activities as during the World War. In England, Y. M. C. A. canteens were established in every camp, and the association arrived in Flanders with the army, going, in many cases, into the front line trenches with the fighting men. The association furnished food, music, recreation and good cheer in general to the men on the line and on leave. After the United States entered the conflict the American organization was stimulated to great activity. The Y. M. C. A. served in hospitals, prison camps, convalescent camps in Russia, France, the Near East—everywhere that service was needed. The service it rendered in keeping the soldier in contact with those at home, even if it were the only service, would be worthy of high praise. During America's part in the war the association raised and spent $300,000 for the benefit of United States troops.

In 1910 there were 2,017 associations in the United States and Canada. These had 496,591 members, and held property and funds to the value of $60,377,122. In 1920 Canada and the United States had 2,194 associations with 868,892 members and property and funds amounting to $128,019,000.

Youngstown, the county seat of Mahoning County, Ohio, is on the Mahoning River. The principal industrial establishments are blast furnaces, steel plants, rolling mills, oil cloth and rubber plants, automobile works, bridge works, furniture factories, etc. Buildings of note are the City Hospital, the Rayen School, the South High School, the Baldwin Memorial Kindergarten, and the Y. M. C. A. building. It has several public and private schools and two libraries—the R. McMillan Free Public and the Rayen School Library. There are several benevolent institutions and forty-six Protestant churches. The site for the city was purchased from the Connecticut Land Company, and the first settlement was made in 1799. In 1910 the population was 79,066; in 1920, 132,358.

Young Women's Christian Association, an interdenominational organization of young women for "the promotion of the social, physical, intellectual, and spiritual condition of young women." The organization grew out of a society formed in London in 1855 to open a home for nurses returned from the Crimean War, and for young business women. Today the Y. W. C. A. is international in scope; it aims to meet every normal need of young women. There are two general classes of associations—the college and the city. The former aims to meet the new girl in a friendly way, to offer opportunities for the development of the girl's religious nature, to conduct mission and Bible study classes through which to broaden the girl's outlook on life, and to afford her a pleasant social life. There is a secretary who gives her whole time to this work; she is aided in the executive work by a cabinet, or body of girls chosen from the members.

The city associations have a greatly varied work. They try always to adapt it to the needs of the particular city or town. Some of their activities are pleasant homes established in the cities, where young women may live well at the least possible expense, and find congenial companionship; lunch-rooms where tempting food is sold at a very low cost, and rest rooms put at the service of weary girls; vacation camps or cottages where a girl of slender means can enjoy a holiday; matrons maintained at railway stations to help sick, lost, or inexperienced girls; classes in gymnasium work, sewing, cooking, languages, art, etc., and free employment bureaus.

Though the membership fee is only a dollar a year, the association is largely self-supporting, and is in no sense a charity. Most city associations have beautiful buildings for the convenience of girls. Summer conferences of association members are held at nine different places in the United States; the student members meet those from city associations in a delightful ten days, the mornings of which are devoted to lectures, discussions, etc., and the afternoons to rowing, bathing, tennis, and other outdoor sports. The Y. W. C. A. is now extending its work to mill villages, rural communities, professional schools, high schools, Indian, and Negro schools.

Ypres, ē′pr', Belgium, is a town in the province of West Flanders that was an important "salient" during the World War, and was almost demolished by the German bombardment that lasted from November, 1914, until May, 1915. It is situated on a small feeder of the Yser River, 35 miles south of Ostend. The famous Cloth Hall, begun in 1201 and completed in 1342 was reduced to ruins, and of the Cathedral of St. Martin, built in the thirteenth century, only a part of the eastern doorway remains. Before the war Ypres was a center of the woolen, lace and linen industry. The 1921 population was 16,720.

Yuan Shi-Kai (1860-1916), a noted Chinese statesman, first president of the republic of China, established in 1912. He was born in Honan province, the son of a district governor. Early aspiring to an official position, but finding himself unable to pass the lengthy and rigid examination in the Chinese classics, he went to Korea; and there through his military and diplomatic talents he soon acquired prestige. The Chinese-Japanese War of 1894-95 forced Yuan Shi-Kai to withdraw from Korea. He was prominent in the reorganization of the Chinese army and navy. During the Boxer uprisings of 1899-1901, Yuan Shi-Kai won the esteem of many western nations through his efforts to protect the foreign legations. In 1901, he succeeded Li Hung Chang as governor of Chi-li. He won the favor of the Dowager Empress and rapidly acquired power. In 1907 he became a Grand Councillor, and President of the Wai Wu Pu, the Chinese foreign office. He was forced to resign in 1909 because of a series of intrigues against him; but when the revolution against the Manchu rulers began in 1911, he was placed in command of the imperial forces. In a few weeks following the outbreak, he was chosen Prime Minister. The revolution spread over south China, and in December, 1911, Dr. Sun Yat Sen, the moving genius of the revolution, was elected Provisional President. But in north China was Yuan Shi-Kai, the real power. It looked as if China would be divided; but Dr. Sun resigned. Yuan Shi-Kai was elected Provisional President in 1912, and in 1913 was regularly elected President for a five year term.

He set about at once to consolidate his power. China was in semi-chaos, and the future was not bright. He secured a trained army, and from European banking houses he borrowed $125,000,000. To Japan, he made valuable commercial concessions because she was strong enough to demand them. This threw the Chinese into tumult again. A monarchy was demanded, and the President was offered the throne. Etiquette commanded a refusal, and etiquette also commanded a second offer. Yuan Shi-Kai accepted the second offer. Insurrections prevented the coronation ceremony three times, and in 1916 it was definitely declared that the monarchy would not be proclaimed. Attempts to take away the President's power failed. But in 1916 he died, quite suddenly. The official cause was "stomach trouble," but it is thought that poison caused his death.

Yucatan, yōō-kä-tän′, a peninsula of Central America. It forms the point of division between the Gulf of Mexico and the Caribbean Sea. Yucatan is not a country. It is a region divided up between Mexico, British Honduras, and Guatemala. It is a limestone plain resting on coral. It is practically an open prairie without timber, streams, or lakes. Any water that falls is absorbed by the soil. Water for domestic purposes may be found by excavating. The ancient inhabitants constructed huge pits in which to store rainwater. The natives raise hemp, in-

dian corn and rice, but the principal product is henequen, or sisal. The limited forests yield logwood. There are salt works and fisheries on the coast.

The inhabitants are descendants of the ancient Mayas, an aboriginal people who surpassed both the Aztecs of Mexico and the Incas of Peru in architectural ability. The ruins of their ancient buildings are still the wonder of antiquarians. Uxmal, the most splendid of these cities, is situated about seventy miles from the coast. The remains are scattered over several square miles. Some of the walls are still standing. The principal buildings were raised on terraced foundations constructed of huge, dressed rocks, fitted together with great skill. Many of these walls were elaborately ornamented with sculpture. These huge blocks were doubtless hauled to the site and lifted into place by Indians under the direction of the priests. If a hundred men and a dozen sisal ropes were not enough more were at hand.

Yucca, yŭk′ka, plants of the lily family native to the arid region of the United States and Mexico. There are twenty varieties. The chief species goes by a number of common names as Adam's needle, bear grass, silk grass, and thready yucca. This yucca has long, narrow, spiny, pointed leaves growing in a tuft from which one or more erect flower stalks rise, each carrying a fine panicle of usually creamy flowers. Whipple's Yucca is a magnificent flowering plant in south California. The tree yucca attains a height of fifteen to twenty feet in the Mojave region. Another kind is known as Spanish bayonet. It has a shocky head of bayonet-shaped leaves on the summit of a palm-like trunk. The leaves of all species are more or less valuable for fiber.

Yukon, a North American river. Its head waters gather in northwestern Canada. The Yukon flows northwesterly through Alaska to a point north of the Arctic Circle. It then turns southwesterly and pursues its course into Bering Sea. From the source of the Lewes in British Columbia to the mouth of the Yukon is a distance of 2,044 miles. The upper portion of the river threads bold mountain scenery; the middle portion is described as flowing through meadows—willow forelands; the lower part of its course winds across a vast and for the most part marshy plain. The mouth is a delta some eighty miles wide. There are many channels. Only the most northerly is deep enough to permit the entrance of ships. The Yukon is navigable for steamboats for a distance of 1,866 miles. It is closed to navigation by ice during eight or nine months in the year. In the summer season regular service is maintained to Dawson in the Klondike district. In length the Yukon is the fourth river of North America. It is the fifth river in the world, branches counted, in the length of navigable waters.

Yukon, a territory of the Dominion of Canada. The district was formed from the Northwest territories in 1898. It was named for the river. The land area is about 196,327 square miles; water area, 649 square miles; population in 1905, 27,000. The territory is governed by a commissioner and a council of ten members, five of whom are elected by the citizens. Dawson, on the Yukon River, is the capital. Gold mining is profitable in the Klondike district. Furs are taken by trappers and Indians. Freight is transported chiefly by means of the Yukon River. The Grand Trunk Railway is expected to build to Dawson.

Z

Zambesi, zăm-bā′ze, a river of South Africa, the fourth in size. Its general course is from west to east. It rises in Portugese West Afriza, crosses Rhodesia, and passes through Portuguese East Africa into Mozambique Channel opposite Madagascar. The river was visited by David Livingstone in 1851. In 1855 he discovered Victoria Falls. The Zambesi drains 600,000 square miles of territory.

The valley has a white man's climate. It is capable of sustaining a tremendous population. It is one of the regions of which the intelligent reader will desire to be informed. It lies in the course of the Cape to Cairo Railway. At Victoria Falls the Zambesi, here a noble stream, plunges into a rocky chasm 400 feet deep. In 1904 a magnificent steel-work railway bridge was thrown across the chasm. The steel work was obtained from a bridge firm of Cleveland, Ohio.

The bridge is the highest—420 feet—in the world, and it was built in the shortest time recorded for such a work, *viz.*, nineteen weeks. No other bridge of its size and capacity has ever been built so cheaply. The bridge is coated with gray paint and is rendered as invisible as possible against the cloud of spray,—"the smoke that sounds," as the natives call it,—that rises from the Falls. The undue obtrusion on the landscape has thus been obviated.

It is proposed to use the waterpower to develop manufactures. There is an abundance of coal, iron, and copper in the vicinity. None of the grandeur of the falls or of the magnificent landscape is to be destroyed in using the power. To prevent this the British government has set aside as a public park a strip of territory six miles long and from one to two miles wide on either side of the river.

See Cape to Cairo Railway; Africa; Uganda.

Zangwill, Israel (1864-), a British author. He was born in London. He received his education at the Jews' Free School and the University of London. He began writing at an early age and soon made a reputation by his novels, dramas, and essays. Zangwill has lectured in England, the United States, Holland, and Palestine. Among his works may be mentioned *Ghetto Tragedies, They That Walk in Darkness, The Mantle of Elijah, The Melting Pot,* and *Blind Children,* a collection of verses. *The Children of the Ghetto,* an exposition of the Jewish temperament, is Zangwill's best known book. He says it is "intended as a study of a race whose persistence is the most remarkable fact in the history of the world." The following stanza is from Imber's *The Watch on the Jordan,* translated into English by Zangwill:

Like the crash of the thunder
Which splitteth asunder
The flame of the cloud,
On our ears ever falling,
A voice is heard calling
From Zion aloud:
"Let your spirits' desires
For the land of your sires
Eternally burn
From the foe to deliver
Our own holy river,
To Jordan return."
Where the soft flowing stream
Murmurs low as in dream,
There set we our watch.
Our watchword, "The sword
Of our land and our Lord,"
By the Jordan then set we our watch.

Zanzibar, a British protectorate. It consists chiefly of the islands of Zanzibar and Pemba lying in the Indian Ocean off the coast of East Africa. The protectorate has a total area of 1,020 square miles and an estimated population of 226,000. The Arabs, about 10,000 in number, are the dominant element. The port of Zanzibar has a population of about 56,000. Most of the natives are Mohammedans. There are Christian missions, both Protestant and Catholic. The chief product of the island is cloves. In 1907 16,263,100 pounds, over 8,000 tons, of cloves were exported. Other exports are copra and ivory. The imports and exports amount to about $5,000,000 each yearly, but a large part of this business consists of merchandise handled for the mainland.

Zebra, an African animal, with straight hoofs. It is classified between the horse and the ass. There are three species. The common zebra is of a whitish color, with regular black stripes running crosswise or the shortest way on nearly every part of its body, legs, tail, and neck. It is about four and one-half feet high at the shoulder. It is an exceedingly lightfooted, graceful animal, with the activity of a horse, but with an extremely intractable, stubborn temper. It was formerly abundant in the hilly regions of South Africa. Although fleet and wary, it seems doomed to extermination. It frequently feeds and herds with the quagga, a very similar animal without stripes on its hind quarters and legs. The zebra is not injured by the tsetse fly. See HORSE; UGANDA.

Zebu, the domestic ox of India. It differs from the ox of Europe in several respects. The horns are short and the shoulders are surmounted by a fleshy hump which is sometimes doubled. The zebu is used to draw plows and carts and to carry passengers. The beef is of fair quality. The hump is considered a delicacy. The zebu varies greatly in size. Some breeds are as large as ordinary cattle, others hardly exceed a young calf in weight. The original stock from which the zebu is descended is unknown. The varieties vary greatly in color. A certain milky white strain is considered sacred to Brahma. Sacred white zebu bulls are kept in temples with great ceremonial.

See BUFFALO; YAK.

Zemstvo, zĕmst′vō, a Russian political body, composed of representatives of the peasant class, the land-owners, and the city people. It was recognized as an official institution in 1864 by Alexander II. In 1890 the rights of the peasants were restricted and after a while the elective franchise was denied them. The zemstvo has control of local economic affairs, such as taxes, public health, education, etc., and exists in thirty-four provinces of Russia. The original purpose of the zemstvo, the promotion and encouragement of extensive home rule, had much opportunity to expand it ideas after the advent of the world war. when the established government failed.

Zend, and **Zend-Avesta.** See ZOROASTER; MYTHOLOGY.

Zenith, an Arab word meaning literally the line of the head,—the point in the heavens directly over the head of the observer. No two observers have the same zenith. A line passing from the zenith through the observer's feet and through the center of the earth would pass through the corresponding node or point in the heavens directly opposite the zenith. This is called the nadir.

Zeno. See STOICS.

Zenobia, queen of Palmyra. She died about 274 or later. She was educated by a celebrated Greek scholar, Longinus, and was able to speak the Latin, Greek, Coptic, and Syrian languages. She was the wife of the king of Palmyra. She accompanied her husband in war and the chase and stimulated him to wage war on the Persians. At her husband's death in 267 she assumed the crown, styling herself Queen of the East. For a time she was regarded favorably by the Romans as an eastern bulwark of the empire, but, on the accession of the energetic and despotic Aurelian to the imperial throne, Roman thirst for conquest led to a declaration of war against Zenobia. She defended herself bravely, but lost the battles of Antioch and Emesa. After defending the walls of Palmyra until resistance was vain, she fled as far as the Euphrates, but was pursued by the Romans, captured, taken to Rome, and forced to walk in the triumphal procession of the victorious Aurelian. Her wit and beauty won her friends. She was accepted in Roman society. Her daughters grew up and married into leading Roman families. The date and manner of her death are not recorded.

Zeppelin, Count Ferdinand van, a distinguished German aeronaut. He was born at Constance, Baden, in 1838. He studied in the polytechnic school at Stuttgart and at a military school in Ludwigsburg. He was an officer of cavalry in the Franco-German war and became interested in the balloon as a military device. The extensive use of balloons by the French, particularly in escaping from Paris after the city had been invested by the German troops, led him to study the subject of flying machines and the navigation of the air. In 1892 he rose

in a dirigible balloon at Bern and made the trip to Lucerne in safety. While others, notably the Americans and French, experimented with aëroplanes, both monoplanes and biplanes, Zeppelin devoted his inventive genius to the development of the balloon. The story of his experiments is a long one. He is indebted to other inventors for ideas, of course. Starting with the balloon, he made three improvements. First he changed the shape to that of a horizontal cylinder pointed at each end; this in order that the ship might move through the air with less resistance. He provided a motor and propeller that he might travel independent of the wind, and he added a rudder that he might guide his balloon in the desired direction. A balloon to hold the raft afloat, a propeller to give speed, and a rudder to determine direction are the essential features of the Zeppelin airship. The type developed by Zeppelin is a dirigible propelled by a motor. Zeppelin did in 1917.

Zero, in mathematics, that which is left after subtracting any quantity from itself, that is, nothing. It means absence of magnitude. The term is also used as the starting point from which a measurement is reckoned, as the zero point on any linear scale, or on a thermometer. On the latter the temperature of freezing is taken as zero. The absolute zero of temperature, however, meaning where there is total absence of heat, has been computed to be at —273° Centigrade. See CHARLES' LAW.

Zeus, in Greek mythology, the chief of the gods. He was the son of Cronus, who ruled before him, and Rhea. Cronus was in the habit of swallowing his children as soon as they were born. Rhea decided to save Zeus. So she gave the father a stone wrapped in cloth to swallow, and concealed the infant in a cave in Mount Ida, where he was tended by nymphs. The goat Amalthea supplied him with milk and bees gathered honey for him. When Zeus was grown he gave his father a draught which caused him to disgorge the children whom he had swallowed. Then the brothers and sisters united to depose their father, calling the Titans to their aid. Zeus, Poseidon, and Pluto divided the dominion by lot. Poseidon obtained the sea; Pluto, the lower world; and Zeus, the heaven or upper air. The earth itself was supposed to be shared in common, although mankind regarded Zeus as more powerful than his brothers. Metis, a daughter of Oceanus and Tethys, was the first wife of Zeus, who swallowed her because it had been prophesied that she should bear a son who should rule the world. Zeus then married Themis, but he preferred Hera and took her for his third wife. Hera is regarded usually as the queen of heaven, sharing the throne with Zeus. The children of Zeus and Hera are Hebe, Ares, and Hephaestus.

Zeus was regarded as the founder of law and order. He avenged wrongs, punished the sinner, and rewarded the virtuous. Nevertheless, he is himself guilty of all sorts of intrigues. He was crafty and almost malicious at times. The original conception of the god doubtless gave him the characteristics of wisdom, justice, and benevolence; but gradually the faults of mankind were ascribed to him. In art Zeus is represented as of majestic appearance. The scepter, the thunderbolt, and the eagle are his symbols. Zeus is identified with the Jupiter of the Romans, but the Roman conception was superior in many respects.

See JUPITER; TITANS; CRONUS.

Zeuxis, zūk'sĭs (460-355 B. C.), a Grecian painter. His principal paintings related to the Trojan war and are known only by description. His picture of *A Boy With Grapes* is said to have deceived the birds who came to pick. But Zeuxis shook his head with the remark, "Had the boy been painted as well as the grapes the birds would have been afraid to come near them."

Zinc, a bluish white metal with a brilliant lustre. It resembles tin, melts at 433°, and is easily vaporized. It is obtained from zinc ores by heating in a retort. The vapor is cooled into a liquid and is cast into plates called spelter. A second distillation gives zinc, free from iron, arsenic, and other foreign ingredients. In the United States zinc ores are found in association with lead throughout the Missouri lead district. Joplin, Missouri, is the American center of production. Next to the mines of the Mississippi region, the zinc ores of Sussex County, New Jersey, are the most important. Zinc is obtained in Colorado and in Wisconsin. A zinc mine located in blue

magnesium limestone of the Saucon Valley, Pennsylvania, has fallen off in production. Foreign zinc mines are found near Cologne and Aix-la-Chapelle, also in Belgium, Great Britain, Italy, the Black Forest, Sardinia, Sweden, Siberia, Spain, Austria, and Poland.

Zinc is much used for coating iron as a preventive against rust—galvanized iron, the product is called. White metal buttons are made from an alloy of zinc and copper. Imitation gold used for gilding is made by an alloy of zinc with copper. Brass contains from sixty-six to seventy-three per cent of zinc, the rest being copper. Zinc roofing is not uncommon. Being a poor conductor of heat sheets of zinc are an excellent fire shield for woodwork. The round sheets used under a stove are not infrequently termed stove zincs. Zinc white is a substitute for white lead in the preparation of paints. Zinc sulphate or white vitriol is extensively used in the preparation of calicoes, and by the druggist in compounding medicine.

See Tin; Galvanizing; Alloy.

Zion, zī′ŭn, the loftiest of the hills on which the city of Jerusalem was built. It was occupied as a stronghold by the Jebusites before it was taken by King David and converted into a citadel. It rises abruptly some three hundred feet above the vale of Hinnom and Kidron. A Turkish mosque, said to shelter the tomb of David, now occupies the southern brow of Zion. The Old Testament writers frequently speak of Jerusalem as Zion and the Daughter of Zion. The prayer of the Hebrew exiles in Babylonia was to be restored to Zion. The name is used also by modern writers to designate the kingdom of God both on earth and in heaven.

Zither, or **Cithern,** a stringed musical instrument. In medieval times it was a modified form of the lute or guitar, and like a guitar was held vertically. The modern zither is more like a four-sided harp. It is laid horizontally on a table. There are thirty to forty metal strings which are played or twanged with a plectum of ivory or horn. The length of the strings is varied by stopping on a fret-board.

Zodiac, zō′dĭ-ăk, a belt 16° wide, 8° on each side of the ecliptic. The Germans call it the animal circle, *Thierkreis*. The space of the zodiac is divided into twelve areas, groups, or constellations, forming a continuous belt of stars extending entirely around the heavens. In the spring the sun passes through the constellations of Aries, or the ram; Taurus, the bull; Gemini, the twins. In summer his companions day and night are first Cancer, the crab; then Leo, the lion; then Virgo, the virgin. In autumn the sun is in Libra, the scales; Scorpio, the scorpion; and Sagittarius, the archer. In winter he travels through Capricornus, the goat; Aquarius, the waterman; and Pisces, the fishes, back to his starting place in the ram again. The constellation of the zodiac which is on the eastern horizon at midnight in January is in mid-sky at the hour of midnight in April and in the western horizon at the hour of midnight in July. See Astrology; Constellation.

Zola, Emile (1840-1902), a noted French novelist. He was a native of Paris. He attended a lyceum or college, but was refused the honor of graduation on the score of illiteracy. He had experience as a clerk, as a salesman in a bookstore, and as a writer for the papers. He attained some standing in the world of letters. He then set himself to work to produce a series of novels dealing with the weakest and vilest phases of Parisian life. Murder, adultery, theft, poisoning, drunkenness, idleness, department stores, mining, mining railways, stock-broking, and misgovernment are some of the topics treated by a busy and rapid pen. The general impression of the literary world is not favorable to Zola. During his later years Zola did much to commend himself by persistent defense of a Captain Dreyfus who had been accused unjustly of treasonable correspondence with the German government. See Dreyfus.

Zollverein, tsōl′fe-rīn, a union of North German states, 1818-1871, for the purpose of collecting customs. It was formed by Prussia to escape the many annoying customs collected by the petty states within its bounds. By 1865 nearly all Germany, outside of Austria, was included in the Union. A single set of custom officers collected customs at the outer border of the union, as is the case in the United States. The revenue was divided according to agreement. The

Zollverein was supplanted practically by the formation of the German Empire at the conclusion of the Franco-Prussian War. In fact, the empire may be said to have grown, in part at least, out of the customs union.

Zone, a portion of the surface of a globe or sphere lying between two parallel planes. In geography the term is applied to each of five great divisions of the earth which are bounded by imaginary circles parallel to the equator. These zones are the torrid, the north and the south temperate, and the north and the south frigid, the prevailing temperature in each zone determining its name. The torrid zone extends 23° 30′ north and 23° 30′ south of the equator. The north frigid zone extends from the Arctic Circle, 23° 30′ to the North Pole; the north temperate zone, 43° in width, lies between the north frigid and the torrid, that is, between the Arctic Circle and the Tropic of Cancer. The south frigid zone extends from the Antarctic Circle to the South Pole; the south temperate zone lies between the Tropic of Capricorn, which bounds the torrid zone on the south, and the Antarctic Circle. The characteristics of the torrid zone are perpetual summer, excessive heat in the sandy deserts, great humidity of forest regions, and almost equal length of day and night; of the temperate zones, a variable climate favorable to vegetation, and neither intense heat nor cold; of the frigid zones, low temperature, unequal length of day and night, with a day lasting through a period of six months followed by a night of the same length at the poles.

Zoölogy, zō-ŏl′ō-jĭ, the science of animal life. The zoölogist is interested in knowing how the parts of an animal's body are made up, what they are used for, how animals manage to live, under what conditions they thrive, how they are distributed, how they produce their kind, and what changes take place with change of circumstances. He is also interested in classifying animals,—setting them off in groups and naming them. There are several subordinate subjects, as ornithology, or the study of birds, entomology, or the study of insects, conchology, or the study of shells, paleontology, or the study of fossils, etc.

The first great name among zoölogists is Aristotle, the Greek. He described many animals, dividing them into those with blood and those that are bloodless. In the latter class he placed snails, clams, insects, etc. The next great name is that of the Swedish Linnaeus. He introduced a system of arrangement by class, order, genus, species, and variety, a plan still followed. He recognized six classes, mammals, birds, amphibia, fishes, insects, and worms.

A Frenchman, Lamarck, distributed the primary classification into vertebrates and invertebrates. Cuvier, also a Frenchman, grouped his classes under four absolute, distinct types,—vertebrates, mollusks, radiates, and articulates. The Englishman, Darwin, contributed the idea of the origin of species by the influence of changed conditions acting through long periods of time.

Zoroaster, the founder of the Parsee religion. Aristotle supposes him to have lived 6,000 years before Plato. Modern authorities locate Zoroaster about 1,000 B. C. He is regarded as a historical personage. He appears to have been a fire-priest among the Bactrians, a simple agricultural people. His teachings spread to Media and Persia and were the basis of the national religion of Persia. He taught the existence of one god, the creator of the world, to whom all worship should be paid. Other doctrines are a heaven and a hell, immortality, a day of judgment, the resurrection of the body, and the coming of a Messiah. The tillage of the soil is the best of actions. Among his followers the priests were known as Magi, whence the word magic. The sacred writings of the followers of Zoroaster are called the Zend-Avesta. The text is written from right to left in the Zend, an ancient language of central Asia, recognized as a sister language to the Sanskrit.

The Zend-Avesta may be regarded as the Bible of the Persians. According to its theology, the supreme being created Ormuzd or Oromasdes, the source of all good, and Ahriman, the source of all evil. Ormuzd created man and made him happy; Ahriman created savage beasts, serpents, and poisonous plants. On this account the Zend-Avesta reminds the reader of the Garden of Eden. It is the fountain source of western ideas of Satan, the Prince of Darkness. As taught by the Magi, the

followers of these two principles of right and wrong are involved in a long struggle, but right is the more powerful and will ultimately prevail. In point of high morality the Zend-Avesta is regarded as next to the sacred writings of the Hebrews—the Bible of the Christian.

During the spread of Mohammedanism the followers of Zoroaster were given the choice of the Koran or the sword. A few fled from Persia into Hindustan, where their descendants still exist and are known as Parsees or fire worshippers. There are 60,000 of them in Bombay. They are well known, and have a reputation for honorable dealing. Some 30,000 live in other parts of India, in Burma, and in China. A few thousand still linger in Persia. There is bitter enmity between them and the Jews. They eat neither beef nor pork. Their dead they expose on a high tower or scaffold. They do not worship the fire they kindle in their fire temples, but they consider kindling the fire an act of worship.

Zouave, zwäv, a French soldier. The original Zouaves were a fair haired, blue-eyed, sun-tanned Berber people living in Algiers and Tunis and the oases of the Sahara. Their young men were employed as soldiers by the dey of Algiers and subsequently by the French. Later the term was transferred to French soldiers who were clad in the baggy trousers of the Arab. The French Zouaves distinguished themselves in the Crimean War. During our Civil War a few Northern regiments adopted the uniform and name.

Zuider Zee, zī′der zē, a border sea of the Netherlands. It is Dutch, signifying South Sea by way of distinction from the North Sea. The Zuider Zee is separated from the North Sea by low islands. It extends inland to a distance of eighty miles and is in general about forty-five miles wide, though at one point the shores are within ten miles of each other. Harlingen and Hoorn are important ports. Amsterdam is situated on a short arm of the sea. The water in general is not deep. Outside of certain channels it is navigable for shallow-draft vessels only. There are valuable oyster beds and plaice fisheries. The shore appears to be sinking. In the twelfth century a large part of the sea was merely a salt marsh. The government is now engaged in building dikes and pumping out the sea water with a view to acquiring a large area of fertile land for agricultural purposes.

Zulus, zōō′lōōz, a tribe of Kafirs inhabiting the southeast coast of Africa. They are a tall, well formed people,—the most warlike tribe in South Africa. Before the introduction of firearms they had clubs, axes, javelins, and shields. They practiced agriculture and had herds of cattle. They came into conflict with the British in 1879. Their chief, the brave Cetewayo, showed no little skill in cutting off British regiments, but he was overpowered, and Zululand was made a part of British Natal. Young Napoleon, the son of Napoleon III, lost his life while serving in a British company against the Zulus.

Zuni, a short range of mountains in Valencia County, New Mexico. For Zuni Indians, see HOPI.

Zurich, tsü′rĭk, a city of Switzerland. In situation, history, and present importance it bears much the same relation to German Switzerland that Geneva does to French Switzerland. It is situated on the green and rapid Limmat, where the latter issues from Lake Zurich. Like Geneva, the city extends along both banks of the lake. Villages, orchards, vineyards, and villas enliven the vicinity. Few cities of Europe have finer promenades or maintain homes commanding a more beautiful view. Zurich is a city of antiquity. It was a Roman military station. In 1219 it became a free imperial city. The cathedral is a Romanesque building of the twelfth century. It is connected with the memory of Zwingli, the founder of Protestantism in German Switzerland. The University of Zurich, founded in 1832, has 125 instructors and about 700 students. The city hall, a massive building dating from 1699, a town library, a number of old churches, a botanical garden, a museum of textiles, the collection of arms, and an art gallery are all worthy of a visit. The chief attractions of the city are a general air of historic quaintness, the lake, the river, and the beautiful scenery of the surrounding hills. The population in 1920 was 207,161. It is the busiest manufacturing town in Switzerland. Silk and

cotton are woven. There are about 10,000 silk looms in the city and canton. There are other manufactures of candles, soap, tobacco, paper, leather, and machinery. The finest woodcarving in Switzerland is to be had at Zurich. The inhabitants are almost entirely Protestant.

Zwingli, tswĭng'lee, **Ulrich** (1484-1531), a Swiss reformer. He was the son of a bailiff in the canton of St. Gall. He studied philosophy and theology at Basel, Berne, and Vienna, and in 1506 took up the work of a parish priest at Glarus. A few years later he served as chaplain in the papal army then operating against the French. In 1516 he was made preacher in the convent of Einsiedeln, then the resort of many pilgrims. In this office he began calling on the Bishop of Constance to reform the Church. He set his face against the preaching of indulgences and became shortly the acknowledged leader of the citizens of Zurich in opposition to the Church of Rome. In 1524, following the example of Luther, with whom he was in correspondence and substantial accord, he married. He may be regarded as the leader of Swiss Protestants of German nationality. Calvin was the leader of the French Protestants. In 1531, in a war between Zürich and the Catholic cantons of Lake Lucerne, Schwyz, Uri, Unterwalden, and Zug, Zwingli took the field, bearing the consecrated banner of his canton, and was slain in battle. Zwingli's Greek Bible with Hebrew annotations in his own hand is preserved in the town library of Zurich. His sword, battle-ax, coat of mail, and helmet are kept in the town arsenal, and are objects of interest to the tourist.

SYNTHETICAL INDEX

AND HOME STUDY OUTLINE

In the following SYNTHETICAL INDEX AND HOME STUDY OUTLINE the titles of related articles in THE STANDARD REFERENCE WORK which lend themselves readily to classification are arranged systematically under such general headings as seem most likely to be of interest. The information is further classified under appropriate subheadings. This enables the student and general reader to see at a glance the topics treated in THE STANDARD REFERENCE WORK which bear upon the subject of inquiry. An ideal outline and guide for a course of reading or home study is thus provided, by the aid of which all information contained in THE STANDARD REFERENCE WORK bearing on many important subjects of investigation can be readily found.

ADDISON, JOSEPH—
Chevy Chase, Coverly Sir Roger de, Kit-Cat Club, Pope A., Spectator, Steele.

AFRICA—
Explorers: Baker, Du Chaillu, Livingstone, Park, Speke, Stanley, Enim Pasha.
Mountains: Atlas, Kilimanjaro, Table Mountain.
Rivers: Congo, Niger, Nile, Zambesi.
Lakes: Albert Nyanza, Nyanza, Tanganyika, Tschad.
Desert: Sahara.
Plants: Baobab, Date, Fig, Palm.
Animals: Crocodile, Eland, Elephant, Giraffe, Gnu, Gorilla, Hippopotamus, Lion, Rhinoceros, Zebra.
General Information: Abyssinia, Algeria, Algeciras, Boers, Bushmen, Cape to Cairo Railway, Cape Colony, Caravan, Copts, Diamond, Enim Pasha, Ethiopia, Guinea, Hottentots, Jameson, Kimberley, Kruger, Liberia, Madagascar, Mahdi, Moors, Nubia, Pillars of Hercules, Pygmy, Rhodes, Senegambia, Somaliland, Sudan, Timbuctoo, Uganda, Union of South Africa.

AGRICULTURE—
Soil and Tillage: Agriculture, Alkali, Bacteria, Bog, Clay, Drainage, Dry Farming, Dust, Earthworm, Fertilizer, Gypsum, Guano, Humus, Irrigation, Lava, Loam, Loess, Manure, Marl, Peat, Phosphates, Plowing, Rain, Rotation, Sand, Soil, Sunshine.
Essential Elements: Calcium, Carbon, Chlorine, Hydrogen, Nitrogen, Oxygen, Phosphorus, Potassium, Silicon, Sodium, Sulphur.
Improvements: Barn, Elevator, Farm, Gin, Hedge, Road, Silo, Windmill.
Implements and Machinery: Cart, Engine, Grindstone, Harrow, Milking Machine, Mower, Plow, Reaper, Scythe, Sickle, Sled, Threshing Machine, Wagon, Whetstone.
Field Crops: Barley, Beets, Broom-Corn, Castor Bean, Cereal, Corn, Cotton, Durum Wheat, Flax, Hemp, Hops, Oats, Peppermint, Potatoes, Rice, Rye, Sorghum, Sugar-cane, Tobacco, Wheat.
Forage: Alfalfa, Alsike, Berseem, Cactus, Clover, Cowpea, Grass, Hay, Kaffir Corn, Lucerne, Millet, Sagebrush, Sedge, Timothy.
Poultry: Chicken, Duck, Egg, Goose, Guinea Hen, Incubator, Ostrich, Peafowl, Pigeon, Poultry, Turkey.
Bee-keeping: Apiary, Bee, Basswood, Buckwheat, Heath, Honey, Wax.
Stock Raising: Ass, Cattalo, Cattle, Goat, Hog, Horse, Lasso, Leather, Merino, Mule, Packing House, Reindeer, Sheep, Stock Raising, Stockyard, Wool, Yak.
Pests and Diseases of Animals: Anthrax, Botfly, Cattle Tick, Foot-rot, Foot and Mouth Disease, Glanders, Heaves, Hog Cholera, Hydrophobia, Lockjaw, Louse, Lumpy Jaw, Mange, Rot, Tick, Tuberculosis.
Dairying: Babcock Test, Annotto, Butter, Butterfat, Cheese, Cow, Ensilage, Holstein, Jersey, Milk, Rennet, Separator.
Orchard Fruits: Apple, Apricot, Cherry, Cold Storage, Damson, Grafting, Horticulture, Lemon, Nursery, Olive, Orange, Peach, Pear, Plum, Prune.
Small Fruits: Blackberry, Blueberry, Catawba, Concord Grape, Cranberry, Currant, Gooseberry, Grape, Huckleberry, Raisin, Raspberry, Strawberry.
Vegetable Garden: Artichoke, Asparagus, Bean, Beet, Cabbage, Cantaloupe, Carrot, Celery, Citron, Cucumber, Egg Plant, Garlic, Gourd, Ground-cherry, Horseradish, Hotbed, Leek, Lettuce, Muskmelon.

Onion, Parsley, Parsnip, Pea, Peanut, Potato, Pumpkin, Radish, Rhubarb, Salsify, Squash, Sweet Potato, Tomato, Turnip, Vegetables, Watermelon, Yam.
Flower Garden: See Flowers under Plants.
Plant Pests: Burdock, Dandelion, Jimsonweed, Mullein, Mustard, Purslane, Quack Grass, Stickseed, Tansy, Thistle, Weeds.
Insect Pests: Aphid, Army Worm, Chinch Bug, Codlin Moth, Potato Beetle, Cotton Boll-weevil, Cricket, Curculio, Cutworm, Gall, Grasshopper, Hessian Fly, Jigger, Locust, Midge, Moth, San José Scale, Weevil.
Plant Diseases: Dry-rot, Ergot, Mildew, Rust, Smut, Wilt.
Insecticides: Bordeaux Mixture, Paris Green, Spraying.
Products: Cork, Flour, Leather, Lumber, Nuts, Olive Oil, Starch, Sugar, Wine.
Plant Life: Acclimatization, Chlorophyll, Cross Fertilization, Germination, Heat, Herb, Hotbed, Light, Mendel's Law, Mutation, Sap, Seed, Water.
Persons of Note: Bailey L. H., Burbank, Downing, Harris, Henderson, Meehan, Olmsted.
Education and Coöperation: Coöperative Store, Experiment Stations, Fair, Farmers' Alliance, Farmers' Institute, Grangers, National Corn Exposition, Postal Savings Banks, Postoffice, Road, School, Telephone.
Allied Sciences: Botany, Chemistry, Forestry, Geography, Physics, Physiology. See also list of Animals and Plants.

AIR—
Air-pump, Airship, Argon, Balloon, Barometer, Carbon Dioxide, Nitrogen, Oxygen, Ozone, Sound, Ventilation, Wind.

ALABAMA—
For Products, Animals, and Plants, see Southern States under United States: Products, etc.
For Minerals, see Southern States under United States: Mineral Products.
Additional References: Birmingham, Creeks, De Soto, Mobile, Negro, Lafitte, Tuskegee.

ALASKA—
Area, Position, and Boundaries. See article Alaska.
Surface and Waters: Yukon, Muir Glacier, Bering.
Animals: Seal, Salmon, Bear, Reindeer.
Minerals: Coal, Copper, Gold.
See also Calendar, Eskimo, Muir, Nome, Seward.

ALCOHOL—
See Beverages.

ALEXANDER THE GREAT—
Aristotle, Bucephalus, Dryden, Gordian Knot, Macedonia, Phalanx, Philip.

ALEXANDRIA—
Alexander the Great, Alexandrian Library, Alexandrian School, Archimedes, Callimachus, Cleopatra, Egypt, Euclid, Hypatia, Lighthouse, Ptolemies.

ALGERIA—
Arab, Berbers, Caravan, Cork, Date, Esparto, France, Mediterranean, Moor, Morocco, Tunis.
See also statistics in article Algeria.

ALPHABET—
See Printing.

ALPS—
Bernard, Berne, Blanc, Cenis, Chamois, Chamounix, Edelweiss, Geneva, Jungfrau, Lucerne, Oberammergau, Po, Rhine, Rhone, Rigi, St. Gothard, Simplon, Tyrol.

AMAZON—
Boa Constrictor, Brazil Nut, Capybara, Cassiquiari, Para, Rubber, Selva, Sloth, South America, Tapir, Wallace A. R.

ANDES—
Alpaca, Bolivia, Chili, Chimborazo, Chinchilla, Colombia, Condor, Cotopaxi, Ecuador, Equator, Llama, Vicuña, Patagonia, Peru, Snowline, South America, Titicaca.

ANIMALS—

Invertebrates.

Protozoa (the simplest animals): Amoeba, Globigerina, Infusoria.
Sponge: Sponge.
Nettle Animals: Coral, Hydra, Jelly-fish, Sea Anemone.
Worms, without segments: Tapeworm, Trichina.
Worms, segmented: Earthworm, Leech.
Echinoderms: Sea-cucumber, Sea-urchin, Starfish.
Crustaceans: Barnacle, Crab, Crayfish, Lobster, Shrimp.
Centipedes: Centipede.
Spiders and Allies: Daddy-long-legs, Mite, Scorpion, Spider, Tarantula.
Mollusks:
a. Limpet, Slug, Snail, Whelk.
b. Clam, Mussel, Oyster, Teredo.
c. Ammonite, Chambered Nautilus, Cockle, Cuttlefish, Octopus, Paper Nautilus, Squid.
Insects: See under Insects.

Vertebrates.

Lowest Vertebrates: Lamprey.
Fishes: See under Fishes.
Amphibians (living both on land and in the water).
a. Amphibians, Frog, Toad.
b. Tailed Amphibians: Mud Puppy, Newt, Salamander.
Serpents: Asp, Anaconda, Boa Constrictor, Cobra, Copperhead, Garter Snake, Moccasin Snake, Python, Rattlesnake, Viper. See also Snakes.
Lizards: Basilisk, Chameleon, Glass Snake, Horned Toad, Iguana, Lizard, Skink.
Tortoises: Tortoises, Terrapins, and Turtles.
Crocodiles: Alligator, Crocodile, Gavial.
Birds: See under Birds.

Mammals (suckling the young):
a. Egg-laying Mammals: Duckbill.
b. Pouched Animals: Kangaroo, Opossum, Tasmanian Wolf.
c. Diggers: Pangolin.
d. Toothless Mammals: Anteater, Armadillo, Sloth.
e. Sea-cows: Dugong, Manatee.
f. Cetaceans (degenerate land animals living in the sea): Dolphin, Porpoise, Whale. See also Ambergris, Spermaceti.
g. Hoofed Animals:
1. Aurochs, Bison, Buffalo, Cattle, Cow, Yak.
2. Bighorn, Chamois, Goat, Ibex, Musk-ox.
3. Pronghorn.
4. Antelope, Gazelle, Gemsbok, Gnu.
5. Caribou, Deer, Fallow Deer, Moose, Reindeer, Wapiti.
6. Giraffe.
7. Alpaca, Camel, Dromedary, Llama, Vicuña.
8. Ass, Horse, Mule, Quagga, Zebra.
9. Hippopotamus, Hog, Peccary, Warthog.
10. Elephant, Rhinoceros, Tapir.
h. Gnawing Animals (rodents — chisel teeth):
1. Chipmunk, Flying Squirrel, Gopher, Prairie Dog, Squirrel, Woodchuck.
2. Beaver.
3. Deer Mouse, Dormouse, Hamster, Lemming, Mouse, Muskrat, Rat.
4. Jumping Mouse.
5. Pocket Gopher.
6. Porcupine.
7. Agouti, Capybara, Guinea Pig, Hare, Rabbit.
i. Bat Family (flyers): Bat, Vampire.
j. Insect Eaters (sharp teeth): Hedgehog, Mole, Shrew.
k. Seals and Sea-Lions: Seal, Sea-Lion, Walrus.
l. Flesh-eating Mammals:
1. Cat, Cougar, Jaguar, Leopard, Lion, Lynx, Ocelot, Ounce, Panther, Tiger.
2. Hyena.
3. Coyote, Dog (Bernard, Fox Terrier, Setter, Spitz), Jackal, Wolf, Fox.
4. The Marten and other fur-bearing animals as Badger, Civet, Ferret, Ichneumon, Otter, Skunk, Weasel, Wolverine.
5. Bear.
6. Raccoon.
m. Apes and Monkeys: Ape, Baboon, Chimpanzee, Flying Lemur, Gorilla, Lemur, Mandrill, Orang-utan.

Fossils or Extinct Animals: Ammonites, Archaeopteryx, Cave Bear, Dinornis, Mammoth, Mastodon, Trilobites. See also Fossil, Horse, Kent's Hole, Rock.

General Terms: Acclimatization, Amphibians, Aquatic, Biology, Carnivora, Celphalopod, Cetacea, Cud-Chewers, Fauna, Genus, Gestation, Mammals, Mollusks, Parasite, Rodents, Zoology. See also Age, Hamburg, Mimicry, Shell, Cell, Hibernation, Taxidermy.
Noted Students of Animals: Baird, Buffon, Cuvier, Hornaday, Huxley, Long W. J., Owen Sir R., Seton E. T., Wallace A.
Related Topics: American Museum of Natural History, American Ornithologists' Union, Angell, Antarctic Regions, Black Beauty, Bergh, Pasteur.

ARABS—
Geography: Arabia, Arabian Sea, Red Sea, Aden, Mecca, Medina, Coffee, Camel, Gazelle, Avicenna, Saladin, Lokman, Raisuli.
Race and Religion: Semites, Bedouins, Mohammed, Koran, Mosque.
History and Government: Sheik, Caliph, Harun-al-Rashid, Bagdad, Cordova, Moors, Saracens, Saladin, Crusades, Turks.
Literature: Aladdin, Alhambra, Ali Baba, Arabian Nights, Barmecide, Fatima, Hegira, Lokman, Old Man of the Sea, Roc.
Learning: Arabian Education, Algebra, Arabian Literature, Arithmetic, Medicine, Alchemy, Averroes, Avicenna.

ARCHITECTURE AND BUILDING—
History. See article Architecture.
Architectural Terms: Acanthus, Arch, Chimney, Dome, Frieze, Gable, Gilding, Lichgate, Mansard Roof, Mosaic, Veneer, Window.
Types of Buildings: Basilica, Bungalow, Castle, Cathedral, Church, Circus, Cleopatra's Needle, Coliseum, Campanile, Earthhouse, Labyrinth, Mosque, Obelisk, Pagoda, Pyramid, Skyscraper, Temple, Tenement.
Noted Buildings: Acropolis, Alhambra, Amiens, Berne, Canterbury, Chartres, Coliseum, Ellora, Erectheum, Escorial, Milan, Notre Dame, Pantheon, Parthenon, Pisa, Pnyx, Rheims, St. Paul's, St. Peter's, St. Sophia, Salisbury, Serapeum, Strasburg, Thebes, Taj Mahal, Warwick Castle, Westminster Abbey, Windsor Castle, York.
Material. See Building Material.
Materials: Adobe, Aluminum, Brownstone, Brick, Carpenter, Concrete, Fresco, Glass, Granite, Iron, Limestone, Lime, Lock, Lumber, Marble, Nail, Paint, Plaster of Paris, Putty, Slate, Steel, Stucco, Terra Cotta, Whitewash.

ARCTIC REGIONS—
Conditions: Alaska, Antarctic, Aurora Borealis, Compass, Day, Greenland, Hammerfest, Iceberg, Iceland, Magnetism, North Pole, North Star, Season, Spitzbergen.

Animals and Inhabitants: Eskimo, Auk, Dog, Hare, Musk-ox, Polar Bear, Ptarmigan, Reindeer, Seal, Whale, Walrus.
Explorers: Andree, De Long, Franklin, Greeley, Kane, Nansen, Nordenskjold, Peary, Schwatka.

ARGENTINA—
Area and Boundaries. See Argentina.
Surface and Waters: Aconcagua, Andes, Patagonia, Chile, Tierra del Fuego, Magellan, La Plata.
Minerals: Copper, Silver, Gold, Mercury.
Plants and Animals: Cotton, Fig, Orange, Lemon, Apple, Peach, Sugar-cane, Pampas, Armadillo, Cattle, Wheat.
Productions: Butter, Beef, Leather, Horses, Cattle.
History: Spain, Uruguay, La Plata, Buenos Ayres.
Manufactures, Occupations, Crops, Domestic Animals, and Education. See Argentina.

ARIZONA—
Area, Position, and Boundaries. See article Arizona.
Surface and Waters: Zuni Mountains, Colorado River, Gila River, Grand Cañon.
Plants and Animals: Gila Monster, Petrified Forest, Cactus, Ostrich, Yucca.
Minerals: Copper, Silver.
Manufactures, Occupations, Crops, Domestic Animals, and Education. See statistics under Arizona.
See also United States, New Mexico, Irrigation, Apaches, Coronado.
For Products, Animals, and Plants, see Southern States under United States: Products, etc.
For Minerals, see Southern States under United States: Mineral Products.
Additional References: Apache, Cactus, Colorado River, Grand Canyon, Petrified Forest, Pueblos.

ARKANSAS—
Area, Position, and Boundaries. See article Arkansas.
Surface and Waters: Arkansas River, Ozark Mountains, Mississippi River, Red River.
Animals: Bear, Turkey, Peccary, Opossum, Raccoon.
Crops: Corn, Wheat, Rice, Cotton, Fruit.
Manufactures, Occupations, Domestic Animals, and Education. See statistics under Arkansas.
See also United States, Oklahoma, Hot Springs.
For Products, Animals, and Plants, see Southern States under United States: Products, etc.
For Minerals, see Southern States under United States: Mineral Products.
Additional References: Hot Springs, Opossum, Raccoon.

ARTISTS—
See Painting.

ASIA—
Area, Position, Boundaries. See article Asia.
Mountains: Ararat, Everest, Himalaya, Khyber Pass, Lebanon, Pamir, Sinai. See also Ural Mountains.
Rivers: Amur, Euphrates, Ganges, Hoang-Ho, Indus, Irawadi, Jordan, Obi, Tigris, Yang-tse-Kiang.
Lakes: Aral, Baikal, Caspian, Dead Sea. See also Black Sea.
Seas. See Map for Arabian Sea, Aral Sea, Bering Sea, Japan Sea, Kara Sea, Persian Gulf, Red Sea, South China Sea, Yellow Sea, etc.
Principal Plant Products: Rice, Wheat, Coffee, Tea, Cotton, Manila, Poppy, Sugar-cane, Bamboo, Caoutchouc, Teak, Pine, Yew, Cypress, Mulberry, Orange, Peach, Pomegranate, Quince, Apricot, Olive, Sycamore, Oleander, Dates.
Animals: Tiger, Elephant, Rhinoceros, Leopard, Bear, Lynx, Marten, Monkey, Deer, Boar, Cat, Snakes, Crocodile, Buffalo, Yak.
Cities: Aden, Bangkok, Batavia, Beirut, Benares, Bengal, Bombay, Calcutta, Canton, Cavite, Delhi, Hang-Chow, Hankow, Harbin, Hyderabad, Lucknow, Madras, Mecca, Mukden, Nagasaki, Nankin, Osaka, Pekin, Port Arthur, Rangoon Samarkand, Shanghai, Singapore, Smyrna Tashkent, Teheran, Tokio, Vladivostok Weihaiwei, Yokohama.
General Information. Consult articles on Babylon, Chaldea, China, India, Japan, Manchuria, Siberia, Siam, Persia, Palestine, Afghanistan, Arabia, Turkey, Tibet, Korea, Mongolia, Turkestan, Armenia, Asia Minor, Amur, Timur, Attila.

ASIA MINOR AND SYRIA—
Antioch, Beirut, Damascus, Ephesus, Jerusalem, Lebanon, Levant, Pergamus, Red Sea, Smyrna, Croesus, Armenia, Amazons, Saladin.

ASTRONOMY—
Historical: Astrology, Horoscope, Nebular Hypothesis.
Astronomical Terms: Asteroids, Aurora Borealis, Comets, Constellation, Crescent, Eclipse, Ecliptic, Equinox, Halo, Meteorites, Milky Way, Nebula, Parallax, Planets, Satellite, Seasons, Shooting Stars, Solstice, Star, Transit, Tropics, Zenith, Zodiac. See also topics under Time.
Heavenly Bodies: Arcturus, Berenice's Locks, Biela's Comet, Cassiopeia, Cynosura, Jupiter, Lucifer, Mars, Mercury, Milky Way, Moon, Neptune, Orion, Pleiades, Polestar, Sagittarius, Saturn, Sirius, Southern Cross, Sun, Uranus, Venus, Virgo. See also list Greek Mythology.
Astronomers: Brahe, Copernicus, Flammarion, Galileo, Halley, Herschel, Hipparchus, Huygens, Kepler, Laplace, Lockyer, Mitchell M., Newcomb, Newton I., Ptolemy, Rosse, Rittenhouse, Schiaparelli, Somerville (Mary).

Astronomical Equipment: Observatory, Greenwich, Lick Observatory, Clark, Telescope, Orrery.

ATHENS—

Geography: Acropolis, Marathon, Piraeus, Salamis, Thermopylae.

History: Amphictyonic Council, Areopagus, Draco, Greece, Solon, Syracuse.

Art: Architecture, Caryatid, Elgin Marbles, Erectheum, Parthenon, Pnyx, Theseum.

Noted Persons: Alcibiades, Aspasia, Aristides, Aristophanes, Demosthenes, Draco, Pericles, Phidias, Sophocles, Themistocles, Theseus, Xanthippe, Xenophon.

AUSTRALIA—

Area, Position, Boundaries. See article Australia.

Cities: Melbourne, Sydney, Adelaide, Brisbane.

Minerals: Gold, Copper, Silver, Coal.

Plants: Oak, Cedar, Pine, Palm, Acacia, Eucalyptus, Baobab, Fig, Madder, Water Lily, Sandalwood.

Animals: Anteater, Bower Bird, Duckbill, Echidna, Emu, Kangaroo, Lyre Bird, Mound Bird, Python, Rabbit, Sheep.

Historical: Cook, Botany Bay, Bushrangers, Australia Commonwealth of, Tasmania, New Zealand, New Guinea.

Manufactures, Occupations, Crops, Domestic Animals, and Education. See statistics under Australia.

AUSTRIA-HUNGARY—

Area, Position, and Boundaries. See article Austria.

Surface and Waters: Alps, Bosnia, Carpathians, Tyrol, Moravia, Bohemia, Silesia, Danube, Adriatic, Constance.

Minerals: Coal, Iron, Quicksilver, Silver, Copper, Lead, Zinc, Sulphur, Graphite, Salt, Gold.

Plants and Animals: Grape, Hop, Cereals, Bear, Ibex, Stork, Wolf, Lynx, Fox, Beaver, Marten, Eagle, Hawk, Bee.

Products and Industries: Wheat, Rye, Indian Corn, Flax, Hemp, Wine, Beer, Honey, Wool, Butter, Oats.

History: Austerlitz, Budapest, Charlemagne, Congress of Vienna, Eugene, Francis Joseph I, Elizabeth (Saint), Germany, Hapsburg, Huss, Italy, Kossuth, Maria Theresa, Margaret, Prague, Metternich, Rudolph, Silesia, Triple Alliance, Venice.

Noted Persons: Dvorak, Haydn, Liszt, Strauss, Tesla.

See also Budapest, Belgrade, Slav, Hun.

Cities: Oberammergau, Austerlitz, Bleinheim, Prague, Trieste, Vienna.

BABYLON—

Alexander, Babylonian Captivity, Belshazzar, Cuneiform Writing, Euphrates, Hammurabi, Mesopotamia, Nebuchadnezzar.

BACTERIA—

Size, Life, Reproduction. See article Bacterium.

Distributors: Fly, Mosquito, Rat, Tsetse, Dust, Water, Wind.

Allied Plants: Fungi, Mold, Yeast.

Usefulness: Butter, Clover, Fermentation, Nitrogen, Vinegar, Wine.

Bacterial Diseases: Anthrax, Cholera, Consumption, Diphtheria, Glanders, Lockjaw, Pneumonia, Rabies, Typhoid Fever, Yellow Fever.

Bacteria Destroyers or Excluders: Alcohol, Antiseptic, Canning, Cold Storage, Creosote, Disinfectant, Formalin, Germicide, Heat, Oil, Preserves, Silo, Sugar, Sulphur, Sunlight, Surgery.

BALKAN STATES—

Position and Boundaries. See article.

States: Bulgaria, Greece, Montenegro, Rumania, Servia, Turkey.

Cities: Athens, Belgrade, Bukharest, Constantinople, Sofia.

BELGIUM—

Area, Position, Boundaries, and Population. See article Belgium.

Minerals: Coal, Lead, Silver, Petroleum.

Plants and Animals: Oak, Ash, Boar, Wolf, Fox, Eagle.

Cities: Antwerp, Bruges, Brussels, Ghent, Liege, Spa, Namur.

History: Belgian Congo, Flanders, Walloon.

Noted Men: Damien (Father), Maeterlinck, Van Eyck.

Manufactures, Occupations, Crops, Domestic Animals, and Education. See statistics under Belgium.

BELL—

Alloy, Casting, Campanile, Chime, Clock, Copper, Liberty Bell, Moscow, Pekin, St. Gall, Westminster Hall.

BEVERAGES—

Non-intoxicating: Cider (sweet), Cocoa, Coffee, Tea.

Malt: Ale, Beer, Brewing, Hop, Malt.

Alcoholic: Absinthe, Alcohol, Arrack, Cognac, Distilling, Gin, Glenlivet, Moonshiner, Moselle, Pulque, Rum, Sack, Toddy, Whiskey, Wine.

See also Distilling, Fermentation, Starch, Sugar, Boiling.

BIBLE—

Abraham, Absalom, Adam, Apocrypha, Cambyses, Concordance, Coverdale, Daniel, David, Decalogue, Douay, Elijah, Gabriel, Goliath, Hammurabi, Herod, High Priest, Isaiah, Jacob, Jerusalem, Jesus Christ, Jews, Jonah, Joseph, Joshua, Noah, Moses, Palestine, Paradise, Pentateuch, Pentecost, Psalms, Pilate, Plagues of Egypt, Ruth, Septuagint, Solomon, St. Peter, Talmud, Tyndale, Wyclif.

See also Ananias, Apollyon, Ark, Azrael, Babylonia, Beloved Disciple, Chaldea, Deluge, Eden, Medes, Scapegoat, Star of Bethlehem, Tabernacle, Tarshish.

BIRDS—

Thrushes: Bluebird, Oven Bird, Robin, Thrush.

Titmice: Chickadee, Nuthatch, Titmouse.
Tree Creepers: Creeper, Tree Creeper.
Dippers: Ouzel.
Wrens: Catbird, Mockingbird, Wren.
Wagtails: Wagtail.
Vireos: Vireo.
Warblers: Bulbul, Nightingale, Redstart, Tailor Bird, Warbler.
Butcherbirds: Shrike.
Wax-wings: Wax-wing.
Swallows: Marten, Swallow.
Tanagers: Tanager.
Finches: Canary, Cardinal, Crossbill, Goldfinch, Grosbeak, Indigo Bird, Junco, Linnet, Ortolan, Snowbird, Sparrow.
Blackbirds: Blackbird, Bobolink, Cowbird, Grackle, Meadow Lark, Oriole.
Crows: Bird of Paradise, Bower-bird, Crow, Jay, Magpie, Raven, Starling.
Larks: Lark, Skylark.
Flycatchers: Kingbird, Pewee, Phoebe, Wood Pewee.
Weak-Footed Birds (inclined to sit rather than to perch): Chimney Swallow, Goatsucker, Humming-bird, Nighthawk, Swift, Whip-poor-will.
Woodpeckers: Guide Bird, Flicker, Sapsucker, Toucan, Wryneck, Woodpecker.
Cuckoos: Cuckoo, Halcyon, Kingfisher.
Parrots (talkers): Hornbill, Parakeet, Parrot, Trogon.
Birds of Prey (large fierce eyes, strong curved bills, and powerful seizing claws): Adjutant, Buzzard, Condor, Eagle, Falcon, Goshawk, Hawk, Kite, Merlin, Owl, Secretary Bird, Vulture.
Pigeons: Carrier Pigeon, Dodo, Dove, Pigeon.
Scratchers (strong feet for scratching and bills adapted to pick up seeds and insects): Bantam, Bustard, Capercailzie, Chickens, Dorkings, Grouse, Guinea Fowl, Jungle Fowl, Mound Birds, Partridge, Peafowl, Pheasant, Ptarmigan, Quail, Sage-cock, Turkey.
Shore Birds (bare stilt legs for wading and long bills for probing): Avocet, Curlew, Lapwing, Oyster-catcher, Plover, Ruff, Sandpiper, Snipe, Turnstone, Woodcock.
Marsh-Dwellers: Coot, Crane, Rail.
Wading Fisher Folk (stilt legs and long, pointed bills): Bittern, Heron, Ibis, Stork.
Flamingoes: Flamingo.
Waterfowl (webbed feet for swimming and shovel bills for scooping and straining): Duck, Goose, Mallard, Swan, Teal, Widgeon.
Large-Winged Fisher Folk: Anhinga, Booby, Cormorant, Frigate, Gannet, Guillemot, Pelican.
Tube-Nosed Fisher Folk (swimmers and midocean birds): Albatross, Mother Carey's Chickens, Petrel.
Long-Winged Swimmers: Albatross, Tern, Gull, Kittiwake.
Weak-Winged Divers: Auk, Grebe, Loon, Puffin.
Flightless Divers: Penguin.
Runners (flightless strong-legged birds): Apteryx, Cassowary, Dinornis, Emu, Ostrich, Roadrunner.
Additional References: American Ornithological Union, Audubon, Audubon Society, Feather, Lyre Bird, Midway Island, Nests, Wilson, Migration, Bird Day.

BLINDNESS—
Braille, Bridgman L., Color, Color Blindness, Dalton, Eye, Keller H., Light.

BOLIVIA—
Area, Position, Boundaries. See article Bolivia.
Surface and Waters: Andes, Amazon, Titicaca.
Minerals: Silver, Gold, Iron, Lead, Copper, Tin, Borax.
Animals and Plants: Alpaca, Llama, Vicuna, Chinchilla, Condor, Mahogany, Rubber.
Cities: La Paz, Potosi.
History: Incas, Pizarro, Bolivar, Argentina.
Manufactures, Occupations, Crops, Domestic Animals, and Education. See statistics under Bolivia.

BOSTON AND VICINITY—
Buildings of Interest: Athenaeum, Bunker Hill (Monument), Faneuil Hall, Library.
Vicinity: Cambridge, Concord, Lexington, Lynn, Plymouth, Quincy, Salem, Waltham.
Public Men: Adams J., Adams J. Q., Alden, Bradford, Butler B., Choate, Everett, Hancock, Morse, Otis, Standish, Story, Vane, Wilson H., Winthrop.
Artists: Allston, Copley, French, La Farge, MacMonnies, Olmstead.
Clergy and Reformers: Brook Farm, Brooks, Channing, Cotton J., Eliot J., Garrison, Hale E. E., Mather, Parker, Phillips, Williams R.
Authors and Publishers: Aldrich, Alcott L., Bancroft, Child, Emerson, Fields, Hawthorne, Holmes, Howe J. W., Howells, Longfellow, Lowell, Motley, Parkman, Prescott W. H., Sparks, Thoreau, Whittier.
Education: Agassiz, Alcott B., Eliot, Harvard University, High School, Wellesley.
History: Boston Massacre, Boston Tea Party.

BRAZIL—
Area and Position. See article Brazil.
Surface and Waters: America, Amazon, Selva.
Minerals: Iron, Lead, Copper, Silver, Gold, Mercury, Zinc, Ruby, Diamond, Emerald.
Animals: Deer, Monkey, Tapir, Capybara, Sloth, Boa Constrictor, Armadillo, Vulture, Parrot, Hummingbird, Butterfly.
Plants: Rubber Tree, Rosewood, Brazil Nut, Mahogany, Sarsaparilla, Cinchona.

Products: Coffee, Rubber, Cacao, Cotton, Hides, Flour, Brazil Nut.
Cities: Rio Janeiro, Bahia, Para, Pernambuco.
Statistics. See article Brazil.

BRIDGES—
Blackfriars, Bridge of Sighs, Brooklyn, Caisson, Cofferdam, Cologne, Duluth, Eads, Ferry, Florence, Great Salt Lake, London, Montreal, Paris, Suspension Bridge, Tay, Westminster.

BRITISH ISLES—
Great Britain, Ireland, Man, Anglesey, Wight, Hebrides, Shetland, Orkney.
See also Channel Islands.

BROWNING, ROBERT AND ELIZABETH BARRETT—
Alcestis, Aurora Leigh, Babel, Child Labor, Euripides, Pied Piper of Hamelin, Strafford.

BRYANT—
Aster, Forestry, Gentian, Partridge, Poetry.

BURIAL—
Catacombs, Cemetery, Christian Antiquities, Cromlech, Embalming, Epitaph, Grant U. S., Mausoleum, Morgue, Mount Vernon, Napoleon, Necropolis, Pere Lachaise, Sarcophagus, Suttee, Wake.

BURNS, ROBERT—
Alloway Kirk, Auld Lang Syne, Ayr, Barleycorn, Daisy, Dumfries, Guinea.

BYRON—
Arion, Bridge of Sighs, Childe Harold's Pilgrimage, Chillon, Dolphin, Drachenfels, Forum, Gondola, Marathon, Mazeppa, St. Peter's, Salamis, Venice.

CALIFORNIA—
For Products, Animals, and Plants, see Southern States under United States: Products.
For Minerals, see Western States under United States: Minerals.
Additional References: Death Valley, Gold, Yosemite Valley, Placer Mining, Sequoia, Eucalyptus, Big Trees, Leland Stanford, Lick Observatory, Burbank, Harte F. B., Miller C. H., San Francisco, Mariposa Lily, Los Angeles, Sacramento, Prune, Ostrich, Raisin, Petroleum, Cougar, Condor, Olive, Fruit Trade.

CANADA—
Position, Area, and Boundaries. See article on Canada.
Surface: Hudson Bay, Baffin Bay, Athabasca, Labrador, Klondike, Yukon Territory. See articles on the various provinces, also Great Lakes, Superior, Erie, Huron, Ontario.
Rivers: Athabasca, Mackenzie, Niagara, St. Lawrence, Saguenay, Saskatchewan, Yukon.
Islands: Baffin Land, Cape Breton, St. Pierre and Miquelon, Newfoundland, Queen Charlotte, Thousand Islands, Vancouver, Prince Edward Island.
Provinces: Quebec, Ontario, New Brunswick, Nova Scotia, Prince Edward Island, Manitoba, Saskatchewan, Alberta, British Columbia.
Cities: Calgary, Charlottetown, Edmonton, Halifax, Hamilton, Kingston, London, Montreal, Ottawa, Quebec, Regina, St. John, Toronto, Vancouver, Victoria, Winnipeg.
Agriculture. See articles on the several provinces, and statistics.
Productions: Wheat, Herring, Cod, Mackerel, Salmon, Gold. See also articles and statistics for the several provinces.
Literature: Frechette, Roberts C. G. D., Carman, Gordon C. W., Lampman, London (Jack) Parker H. G., Smith G.
Noted Persons: Borden, Cartier, Connaught, Dawson, Frontenac, Grant, Grenfell, Laurier, Macdonald, MacKenzie, Montcalm, Mount Stephen, Osler, Peterson, Scott, Strathcona.
Other References: Acadia, Canadian National Park, Longfellow, Evangeline, Jesuits, Hudson Bay Company, Laval University, McGill University, Treaty of Paris, Reciprocity, Niagara Falls.

CARBON—
Properties. See article Carbon.
Occurrence: Carborundum, Coal, Charcoal, Diamond, Graphite, Lampblack, Peat.
Combinations: Bone, Bread, Carbon Dioxide, Coffee, Fat, Gas, Milk, Mineral Waters, Oil, Petroleum, Tea, Vinegar, Wine.
Heat: Food, Heat, Lighting, Plant.

CARICATURE—
Cruikshank, Hogarth, Lincoln, Nast, Punch, Thackeray, Cartoon.

CARLYLE, THOMAS—
Boswell, Chelsea, Coleridge, Frederick II, French Revolution, Johnson S., Macaulay, Napoleon, Sartor Resartus, Stonehenge.

CHARLEMAGNE—
Aachen, Alcuin, Carolingians, Holy Roman Empire, Roland, Vienna.

CHAUCER—
Canterbury, Canterbury Tales, Daisy, Morris, Tabard.

CHEMISTRY—
History: Alchemy, Chemistry.
Important Elements: Aluminum, Antimony, Argon, Arsenic, Barium, Bismuth, Boron, Bromine, Cadmium, Calcium, Carbon, Chlorine, Chromium, Cobalt, Copper, Fluorine, Gold, Glucinum, Hydrogen, Iodine, Iridium, Iron, Lead, Lithium, Magnesium, Manganese, Mercury, Nickel, Nitrogen, Oxygen, Phosphorus, Platinum, Potassium, Radium, Rubidium, Selenium, Silicon, Silver, Sodium, Strontium, Sulphur, Tellurium, Thallium, Tin, Titanium, Tungsten, Uranium, Zinc.
Chemicals and Chemical Terms: Acetylene, Acid, Alcohol, Air, Alkali, Alum, Ashes, Alkaloid, Allotrophy, Base, Borax, Benzine, Caffeine, Coal Tar, Combustion,

Carbolic Acid, Calomel, Chloroform, Chloral, Choke-damp, Disinfectant, Dye, Dextrin, Elixir, Ether, Gas, Laboratory, Litmus, Metallurgy, Salt, Saltpeter, Steam, Thymol, Mineral Wool, Saccharin, Solution, Range, Spontaneous Combustion, Hydrogen Peroxide, Metals.

Chemists: Argand, Berzelius, Bunsen, Cavendish, Dalton, Davy, Glauber, Lavoisier, Liebig, Mohr, Priestly, Scheele, Wiley.

Allied Subjects: Agriculture, Alchemy, Physics, Physiology.

CHILE—

Area, Position, and Population. See article Chile.

Surface and Waters: Andes, Magellan, Desert, Patagonia, Argentina, Juan Fernandez.

Minerals: Copper, Silver, Nickel, Mercury, Iodine, Gypsum, Lapis Lazuli, Saltpeter.

Animals: Alpaca, Llama, Condor, Buzzard, Chinchilla, Clam, Spider, Partridge.

Plants: Oak, Quebracho, Cypress, Laurel, Palm, Strawberry, Bamboo.

Productions: Lumber, Beef, Leather, Flour, Beans, Walnut, Alfalfa, Wool, Quince, Guano, Metals.

Cities: Santiago, Valparaiso.

CHINA—

Area, Position, and Boundaries. See article Chinese Empire.

Surface and Waters: Himalayas, Hoang-Ho, Yang-tse-Kiang, Tibet, Manchuria.

Minerals: Mercury, Lead, Tin, Zinc, Kaolin.

Plants: Pine, Cypress, Yew, Oak, Palm, Bamboo, Orange, Pomegranate, Camphor, Azalia, Hydrangea, Lily, Rose.

Animals: Tiger, Leopard, Bear, Lynx, Elephant, Rhinoceros, Tapir, Pheasant, Cormorant, Swan, Goldfish.

Products: Rice, Wheat, Sugar, Castor Bean, Tobacco, Ginseng, Opium, Cotton, Silk, Lacquerware, Indigo, Camphor, Bristle, Ivory. See also Manchuria.

Cities: Canton, Hang-Chow, Hankow, Harbin, Hong Kong, Mukden, Nankin, Peking, Shanghai, Weihaiwei.

Statistics. See article Chinese Empire.

History: Bell, Boxers, Confucius, Great Wall, Gunpowder, Japan, Korea, Li Hung Chang, Literature, Paper, Taoism, Trepang, Genghis Khan.

See Also: Chopsticks, Queue, Port Arthur, Trans-Siberian Railroad.

CHIVALRY—

Armor, Castle, Cervantes, Don Quixote, Feudalism, Hauberk, Heraldry, Tabard.

CITIES AND TOWNS—

North America: Aberdeen, Akron, Albany, Albuquerque, Andover, Annapolis, Ann Arbor, Asbury Park, Atlanta, Atlantic City, Auburn, Augusta, Aurora, Baltimore, Bangor, Baton Rouge, Bay City, Beloit, Bennington, Berkeley, Birmingham, Bisbee, Bismarck, Bloomington, Boise, Boston, Bridgeport, Brockton, Brooklyn, Buffalo, Burlington, Butte, Calgary, Cambridge, Camden, Canton, Cedar Rapids, Charleston, Charlotte, Chattanooga, Cheyenne, Chicago, Cincinnati, Cleveland, Clinton, Colorado Springs, Columbia, Columbus, Concord, Council Bluffs, Covington, Dallas, Danville, Davenport, Dayton, Decatur, Denver, Des Moines, Detroit, Duluth, East St. Louis, Edmonton, Elgin, Elizabeth, El Paso, Evansville, Fall River, Fort Smith, Fort Wayne, Fort Worth, Frankfort, Gettysburg, Grand Forks, Grand Rapids, Great Falls, Green Bay, Halifax, Hamilton, Harrisburg, Hartford, Havana, Helena, Holyoke, Honolulu, Hot Springs, Houston, Indianapolis, Jackson, Jackson City, Jacksonville, Jamestown, Jefferson City, Johnstown, Joliet, Juneau, Kalamazoo, Kansas City, Kaskaskia, Key West, Kingston, Knoxville, Lancaster, Lansing, Laramie, Lawrence, Lead, Lexington, Lincoln, Little Rock, London, Los Angeles, Louisville, Lowell, Lynn, Macon, Madison, Manchester, Memphis, Meridian, Mexico, Milwaukee, Minneapolis, Mobile, Monterey, Montgomery, Montpelier, Montreal, Nashville, Natchez, Newark, New Bedford, New Harmony, Newport, Nome, Norfolk, Oakland, Ogden, Oklahoma City, Olympia, Omaha, Oshkosh, Parkersburg, Pasadena, Paterson, Pawtucket, Peoria, Philadelphia, Phoenix, Pierre, Pine Bluff, Pittsburgh, Portland, Princeton, Providence, Pueblo, Quebec, Quincy, Racine, Raleigh, Reading, Regina, Reno, Richmond, Rochester, Rockford, Rutland, Saginaw, St. Augustine, St. John, St. Louis, St. Paul, Salt Lake City, San Antonio, San Diego, San Francisco, Santa Fe, Savannah, Scranton, Seattle, Shreveport, Sing Sing, Sioux City, Sioux Falls, Sitka, South Bend, South Omaha, Spokane, Springfield, Superior, Syracuse, Tacoma, Tallahassee, Tampa, Tarrytown, Terre Haute, Texarkana, Toledo, Topeka, Toronto, Trenton, Troy, Tucson, Utica, Vancouver, Vera Cruz, Vicksburg, Victoria, Waltham, Washington, Waterbury, West Point, Wheeling, Wichita, Wilkes-Barre, Wilmington, Winnipeg, Worcester, Yonkers, Yorktown, Youngstown.

South America: Buenos Ayres, Callao, Caracas, La Paz, La Plata, Lima, Montevideo, Para, Pernambuco, Quito, Rio de Janeiro, Santiago, Valparaiso.

Europe: Aachen, Aberdeen, Adrianople, Agincourt, Amiens, Amsterdam, Antwerp, Archangel, Astrakhan, Athens, Augsburg, Austerlitz, Avignon, Baku, Balaklava, Balbriggan, Bannockburn, Barcelona, Basil, Bath, Bayreuth, Belfast, Belgrade, Berlin, Berne, Bingen, Birmingham, Blarney, Blenheim, Bologna, Bonn, Bordeaux, Boulogne, Bremen, Brighton, Bristol, Bruges, Brussels, Byzantium, Cadiz, Calais, Camelot, Canter-

bury, Capua, Carlisle, Carlsbad, Chartres, Chelsea, Chemnitz, Constance, Constantinople, Christiania, Cinque Ports, Coblenz, Cologne, Copenhagen, Cordova, Cork, Cracow, Cremona, Danzig, Delft, Delphi, Derby, Douay, Dover, Dresden, Dublin, Dumbarton, Dumfries, Durham, Dusseldorf, Edinburgh, Ems, Epsom, Riesole, Florence, Fontainebleau, Frankfurt, Free Cities, Geneva, Genoa, Ghent, Glasgow, Gothenburg, Göttingen, Greenwich, Gretna Green, Haarlem, Hague, Hamburg, Hammerfest, Hampton, Havre, Heidelberg, Hohenlinden, Kensington, Kiel, Kilkenny, Killarney, Kronstadt, La Rochelle, Leeds, Leicester, Leipsic, Leyden, Lichfield, Liege, Limerick, Limoges, Lincoln, Linlithgow, Lisbon, Liverpool, London, Londonderry, Lucerne, Lyons, Madrid, Mainz, Malaga, Manchester, Marseilles, Maynooth, Messina, Metz, Milan, Monte Carlo, Moscow, Munich, Namur, Nancy, Nantes, Naples, Newcastle, Nice, Nijni Novgorod, Nimes, Nuremberg, Oberammergau, Odessa, Olympia, Oporto, Orleans, Oxford, Padua, Paisley, Palermo, Paris, Pisa, Potsdam, Prague, Pompeii, Ravenna, Rheims, Riga, Rome, Rotterdam, Rouen, St. Cloud, St. Etienne, St. Petersburg, Salamanca, Salisbury, Salonika, Sebastopol, Seville, Sevres, Sheffield, Smalkald, Southampton, Spa, Stirling, Stockholm, Stornoway, Strasburg, Stratford, Stuttgart, Syracuse, Thebes, Toledo, Tours, Treves, Trieste, Trondhjem, Troy, Utrecht, Valencia, Valladolid, Venice, Verona, Vienna, Warsaw, Weimar, Westminster, Winchester, Wittenberg, Worcester, Worms, Wurtemberg, York, Zurich.

Asia: Aden, Antioch, Baalbec, Babel, Babylon, Bagdad, Bangkok, Batavia, Beirut, Benares, Bengal, Bethlehem, Bombay, Calcutta, Canton, Cavite, Damascus, Delhi, Ellora, Ephesus, Hang-Chow, Hankow, Harbin, Hyderabad, Jericho, Jerusalem, Lucknow, Madras, Manila, Mecca, Medina, Mukden, Nagasaki, Nankin, Nineveh, Osaka, Palmyra, Palestine, Pekin, Pergamus, Persepolis, Pondicherry, Port Arthur, Rangoon, Samarkand, Shanghai, Singapore, Smyrna, Sodom, Tashkent, Teheran, Tokio, Tyre, Vladivostok, Weihaiwei, Yokohama.

Africa: Alexandria, Cape Town, Carthage, Kimberley, Memphis, Thebes, Timbuctoo, Tripoli.

Australia: Adelaide, Brisbane, Melbourne, Sydney.

Philippine Islands: Cavite, Manila.

Hawaii: Honolulu.

CITY PROBLEMS—

Aqueduct, Board of Health, Consumption, Dock, Ferry, Franchise, Garbage, Gas, Heating and Ventilating, Municipal Ownership, Octroi, Pavement, Rat, Sanitation, Sewage, Skyscraper, Street Railway. Taxation, Telegraph, Telephone, Tenements, Typhoid Fever, Waterworks.

See also Berlin, Chicago, Havana, London, Manchester, New Orleans, New York, Paris, San Francisco, Des Moines, and other cities.

CIVIL GOVERNMENT—

Cities: See City Problems, Municipal Government, Primary Elections.

Local Government: Assessor, Ballot, Coroner, Initiative and Referendum, Recall, Schools, Sheriff, Town Meeting.

State Government: Eminent Domain, Ex-Post Facto Law, Dispensary, Legislature, Naturalization, Nullification, Prohibition, Taxation, Woman Suffrage.

National Government: Alien, Ambassador, Annapolis Naval Academy, Army, Amnesty, Attorney General, Cabinet, Call of the House, Caucus, Census, Chief Justice, Civil Service, Coast and Geodetic Survey, Congress, Constitution, Consul, Customs, Dock, Electoral College, Extradition, Free Trade, Impeachment, Internal Revenue, Interstate Commerce, Mint, Navy, Parcels Post, Passport, Pensions, Political Parties, Postoffice, Postal Savings Banks, President, Presidential Election, Pure Food Law, Quorum, Republic, Revolution, Right of Way, Riparian Rights, Secret Service, Secretary of State, Senate, Speaker, Spoils System, Statuary Hall, Tariff, Territory, Treason, Treaty, Vice-President, West Point.

Foreign Government: Anarchist, Arbitration, Balance of Power, Budget, Carte Blanche, Cortes, Crown, Czar, Debts National, Diet, Diplomatic Service, Doge, Duma, Hague Tribunal, International Law, Khedive, Marque and Reprisal, Neutrality, Old Age Pensions, Parliament, Pharaoh, Precedence, Shire.

See also articles on various foreign countries.

CLOTHING—

See Home Economics.

COAL—

Aniline, Bitumen, Carbon, Charcoal, Coke, Creosote, Fire, Graphite, Illinois, Illuminating Gas, Jet, Ohio, Petroleum, Pennsylvania.

COLORADO—

For Products, Animals, and Plants, see Middle States under United States: Products.

For Minerals, see Western States under United States: Minerals.

Additional References: Cantaloupe, Colorado River, Denver, Fremont, Greeley, Irrigation, Petroleum, Pike's Peak, Rio Grande, Rocky Ford, Woman Suffrage.

COLOMBIA—

Area and Position. See article Columbia.

Surface and Waters: Andes, Venezuela, Ecuador, Caribbean, Darien.

Minerals: Coal, Platinum, Gold, Silver, Copper, Lead, Petroleum.

Animals: Monkey, Puma, Deer, Sloth, Armadillo, Alligator, Cavy, Tapir, Condor, Parrot, Stork, Boa Constrictor, Crane, Turtle.
Plants: Coffee, Palm, Logwood, Orchids, Rubber, Sarsaparilla, Indigo.
Products: Rice, Cotton, Yam, Banana, Glass, Quinine, Leather, Beef, Coffee, Tobacco, Ivory, Nut, Vanilla.
History: Balboa, Pizarro, Bolivar, Panama.
Statistics. See article Colombia.

COMMERCE—
Balance of Trade, Bank, Barter, Bartholomew Fair, Board of Trade, Caravan, Chamber of Commerce, Cold Storage, Consul, Dock, Free Trade, Hanseatic League, Leipsic, Lloyd's London Exchange, Lloyd (North German), New York, Nijni-Novgorod, Norway, Portage, Railroad, Steamship, Suez Canal, Tonnage, Trade Mark, Vera Cruz, Wagon.
For articles of Commerce, see statistics in articles on the leading countries.

CONNECTICUT—
For Products, Animals, and Plants, see Northern States under United States: Products, etc.
For Minerals, see Eastern States under United States: Minerals.
Additional References: Hartford, New Haven, Yale, Charter Oak, Sewing Machines, Clocks, Hartford Convention, Insurance, Arnold B.

COOPER, JAMES FENIMORE—
Algonquin, Deerslayer, Uncas, Indians, Jones John Paul, Leather-stocking, Literature (American).

COPPER—
Occurrence and Properties. See article Copper.
Deposits: Arizona, Michigan, Montana, Butte, Utah, Canada, Mexico, Spain, Portugal, Japan, Australia.
Preparation: Mining, Ductility, Great Falls, Butte, Calumet.
Use: Coin, Penny, Cash, Bronze, Bell, Sculpture, Wire, Telegraph, Telephone, Type, Brass.

CRIMES AND PUNISHMENTS—
Arson, Bastille, Bertillon System, Blue Laws, Botany Bay, Bridewell, Capital Punishment, Crime, Ducking Stool, Extradition, Guillotine, Howard J., Jukes, Kidd, Mafia, Molly Maguires, Penitentiary, Pillory, Pinkerton A., Prison, Rack, Search Warrant, Sherlock Holmes, Sing Sing, Smuggling, Stocks, Tower of London, Treason, Vigilance Committee.

CROSS, MRS. (GEORGE ELIOT)—
Adam Bede, Romola, Silas Marner, Savonarola.

CUBA—
Antilles, Banana, Coffee, Columbus, Fig, Garcia, Gomez, Havana, Palma, Pineapple, Spanish-American War, Sugar, Tobacco, Wood, Yellow Fever.

DELAWARE—
For Products, Animals, and Plants, see Middle States under United States: Products, etc.
For Minerals, see Eastern States under United States: Minerals.
Additional References: Penn, Gunpowder, Peach, Canal, Stuyvesant, Taylor B.

DENMARK—
Area and Position. See article Denmark.
Surface and Waters: North Sea, Baltic, Dunes, Netherlands.
Animals: Rat, Mink, Weasel, Owl, Crow, Stork.
Products: Cattle, Eggs, Butter, Rye, Barley, Hay, Pottery, Linen, Wool.
History: Copenhagen, Nelson, Jutes, Kitchen-Middens, Germany, Iceland, Greenland, Faroe Islands, Knute, Hanse Towns, Sweden, Norway, Norsemen, Christian IX, Congress of Vienna.
Noted Men: Andersen H. C., Brahe, Egede, Finsen, Knute, Oersted, Thorwaldsen, Brandes, Amundsen.
Statistics. See article Denmark.

DICKENS—
Life. See articles on Dickens and Boz.
Works: Barnaby Rudge, Bleak House, Christmas Stories, David Copperfield, Dombey and Son, Little Dorrit, Martin Chuzzlewit, Nicholas Nickleby, Old Curiosity Shop, Oliver Twist, Our Mutual Friend, Pickwick Papers, Tale of Two Cities.
Characters: Artful Dodger, Barkis, Bagstock, Bardell, Betsy Trotwood, Buzfuz, Captain Cuttle, Cheeryble Brothers, Dame Durden, Dolly Varden, Dotheboys Hall, Peggotty, Fagin, Jarley, Mrs. Jellyby, Little Nell, Squeers, Micawber.
Quotations: Ivy.

DISTRICT OF COLUMBIA—
Maryland, Potomac, United States, Virginia, Washington.

DOMESTIC SCIENCE—
See Home Economics.

DRAMA—
Descriptive: Antigone, Comedy, Comus, Coventry, Drama, Farce, Figaro, Melodrama, Miracle Play, Oberammergau, Punch and Judy, Thalia, Thespis, Tragedy.
Accessories: Act, Actor, Amphitheater, Blackfriars, Chorus, Covent Garden, Globe Theater, Harlequin, Mask, Puppet, Scene, Stage, Theater, Vaudeville.

DRAMATISTS—
See Noted Men under various countries.

DRUGS—
Aconite, Aloe, Arnica, Arsenic, Absinthe, Asafoetida, Balm of Gilead, Balsam, Boneset, Coca, Camomile, Camphor, Colocynth, Epsom, Hashish, Hoarhound, Ipecac, Jalap, Lobelia, Manna, Nicotine, Nux Vomica, Opium, Quinine, Sarsaparilla, Senna, Stramonium, Tobacco.
See also Plants, Medicinal.

DWARF—
Barnum, Du Chaillu, Giant, Pygmy, Tom Thumb.
DYES—
Aniline, Annotto, Cobalt, Cochineal, Color, Galls, Indigo, Ink, Iodine, Lake, Logwood, Madder, Saffron, Sepia, Woad.
EARTHENWARE—
Adobe, Amphora, Brick, China, Clay, Delft, Faience, Glass, Kaolin, Lamp, Limoges, Majolica, Meissen, Nineveh, Porcelain, Pottery, Satsuma, Sevres, Talc, Terra Cotta, Tiling, Wedgewood.
ECUADOR—
Area and Position. See article Eucador.
Surface and Waters: Andes, Chimborazo, Cotopaxi, Pacific, Galapagos Is.
Animals: Jaguar, Puma, Alpaca, Llama, Chinchilla, Condor, Crane, Humming-bird, Butterfly.
Plants: Cinchona, Ebony, Cedar, Palm, Indigo, Sugar-cane, Banana, Breadfruit, Pomegranate, Orange, Lemon, Mango, Redwood, Yam.
Products: Sugar, Ivory, Nuts, Cacao, Coffee, Rubber, Quinine, Vanilla, Sarsaparilla, Beef, Laces.
History: Pizarro, Incas, Colombia, Peru, Bolivar, Quito.
Statistics. See article Ecuador.
EDUCATION—
Systems: Academy, Alexandrian School, Athletics, Arabian Education, Business College, College, Babylonia, Chaldea, Coeducation, Experiment Stations, Fagging, Feeding of School Children, Farmers' Institutes, Degree, Domestic Art in Schools, Domestic Science in Schools, Compulsory Education, Commencement, Master of Arts, Military Schools, Pratt Institute, National Educational Association, Schools for Feeble Minded, Fellowship, Industrial Schools, Jahn, University Extension, Gymnasium, High School, Kindergarten, Jesuits, Lyceum, Normal School, Real Schulen, University, Sunday School, Sophists, Schools (Secondary), Schools (Common), Delsarte.
Subjects: Composition English, Algebra, Arithmetic, Agriculture, Astronomy, Botany, Chemistry, Debate, Domestic Science, Economics, Ethics, Esthetics, Drawing, Philosophy, Psychology, Geography, Geometry, History, Latin, Law, Literature, Manual Training, Medicine, Physics, Physiology, Reading, Sewing, Sloyd, Spelling, Trigonometry, Zoology, Sociology, Physiography, Nature Study.
Institutions: Annapolis Naval Academy, Amherst, Bec, Bede, Brown, Bryn Mawr, Berlin, Bologna, Bowdoin, Carlisle Institute, Cambridge, Catholic University of America, Chicago, Clark, Carnegie Foundation, Carnegie Institution, Columbia, Cornell, Dartmouth, Eton, Ecole Des Beaux Arts, Girard, Göttingen, Hampden, Harvard, Heidelberg, Jena, Johns Hopkins, Leland Stanford, Maynooth, Oberlin, Oxford, Princeton, Rugby, Royal Institution of Great Britain, Royal Society, Sorbonne, Tulane, Teachers' College, Smith College, Wellesley, West Point, Western Reserve, William and Mary, Washington and Lee, Williams, Valparaiso, Yale, York.
Enrollment: Consult statistics in articles on the several states and countries.
Educators. See Noted Men under the various countries.
Appliances: Chalk, Crayon, Dictionary, Diploma, Encyclopedia, Furniture, Hornbook, Lead-pencil, New England Primer, Pen, Pencil, Slate, Stencil.
EGYPT—
Physical Features: Fayum, Nile, Sahara.
Animals: Crocodile, Hippopotamus, Hyena.
Cities: Alexandria, Cairo, Edfu, Memphis, Suez, Thebes. See also Suez Canal.
Agriculture: Irrigation, Nile, Sirius.
Architecture: Edfu, Obelisk, Pyramid, Sphinx, Temple, Thebes.
Customs: Animal Worship, Embalming.
People: Arabs, Berbers, Copts, Ham.
Rulers: Cleopatra, Khedive, Pharaoh, Ptolemy, Rameses, Cheops.
Learning: Alexandria, Alexandrian Library, Alexandrian School, Arabian Education, Archimedes, Book of the Dead, Callimachus, Ebers, Literature, Geometry, Hamilcar, Rosetta Stone.
Mythology: Ammon, Apis, Isis, Osiris, Serapis.
EMERSON—
Alcott, Alder, Bee, Blizzard, Cathedral, Concord, Linnaeus, Michelangelo, Rhododendron, Stonehenge, Thoreau, Transcendentalism.
ENGLAND—
Waters: Avon, English Channel, North Sea, Severn, Thames. See also Canal.
Minerals: Coal, Iron, Tin, Lead, Zinc, Chalk, Flint, Clay, Slate, Salt, Limestone, Granite.
Manufactures: Steel, Fabrics, Hosiery, Cotton, Linen, Cutlery, Pottery, Drugs, Dyes, Paper, Leather.
Cities and Towns: Bath, Birmingham, Brighton, Bristol, Camelot, Canterbury, Carlisle, Chelsea, Cinque Ports, Derby, Dover, Durham, Epsom, Greenwich, Hampton, Kensington, Leeds, Leicester, Lichfield, Lincoln, Liverpool, London, Manchester, Newcastle, Oxford, Salisbury, Sheffield, Southampton, Spa, Stratford, Westminster, Worcester, York.
Political Divisions and Localities: Aldershot, Cornwall, Dartmoor, Eddystone, Exmoor, Hundred, Lancaster, Land's End, Man, Newcastle, New Forest, Sherwood Forest, Wight.
Race Elements: Anglo-Saxons, Boadicea, Celts, Hengist and Horsa, Jutes, Latin, Normans.

Battles and Wars: Agincourt, Armada, Crecy, Hastings, Runnymede, Wars of the Roses.

Court and Crown: Albert, Alfred, Arthur, Bath, Bayeux Tapestry, Benevolences, Black Prince, Boleyn, Cavalier, Charles, Commonwealth, Curfew, Earl, Edward, Elizabeth, George, Hanover, Harold, Henry, Jacobites, James, Knute, Lady Jane Grey, Margaret, Mary, Monmouth, Nash, Precedence, Prince of Wales, Protectorate, Richard, Star Chamber, Stuart, Tudor, Warbeck, William.

Parliament: Bills of Rights, Bradlaugh, Chiltern Hundreds, Conservative, East India Company, Gunpowder Plot, Habeas Corpus, Hampden, Hughes, Long Parliament, Liberals, Oates, O'Connell, Peers, Petition of Rights, Rye House Plot, Tory, Walpole, Cabinet, Whig.

Reforms: Ball J., Cobden, Cade, Chartists, Booth, Corn Laws, Factory System, Hill, Magna Charta, Peel, Pensions, Wat the Tyler, Wilberforce.

Soldiers: Cromwell, Gordon, Hastings, Marlborough, Monk, Brock, Clive, Havelock, Monmouth, Oglethorpe, Raleigh, Rupert, Sidney, Kitchener, Wellington, Warwick, Wolseley, Wolfe.

Sailors: Cook, Baffin, Baker, Frobisher, Franklin J., Grenville, Gilbert, Hudson, Park, Parry, Speke, Stanley, Vancouver, Nelson.

Statesmen and Public Speakers: Bright, Burke, Bradlaugh, Chamberlain, Curzon, Fox, Gladstone, Grenville, Pitt, Pym, Palmerston, More, Morley, Salisbury, Disraeli, Roseberry, Strafford, Balfour, Asquith, Burns, Brougham, Lloyd-George.

Merchants: Gresham, Whittington, Rhodes.

Painters and Sculptors: Du Maurier, Burne-Jones, Flaxman, Hogarth, Hunt, Landseer, Leighton, Millais, Rossetti, Reynolds, Turner, Watts.

Playwrights and Actors: Beaumont, Congreve, Cibber, Dekker, Dryden, Fletcher, Goldsmith, Garrick, Jonson, Massinger, Marlowe, Macready, Kean, Kemble, Ireland, Irving, Shakespeare, Sheridan, Tennyson, Udall, Terry, Siddons.

Poets and Poetry: Austin, Beowulf, Bourdillon, Browning, Brut, Byron, Caedmon, Campbell, Chatterton, Chaucer, Coleridge, Cowley, Cowper, Dobson, Dryden, Fitzgerald, Gay, Goldsmith, Gray T., Henley, Hemans, Herrick, Hogg, Hood, Howitt, Ingelow, Keats, Kipling, Layamon, Lovelace, Lytton, Milton, Moore T., Morris W., Patmore, Pollock, Pope, Proctor, Shelley, Skelton, Southey, Spenser, Surrey, Swinburne, Tennyson, Thompson, Watson W., Watts, Wordsworth, Young. Canterbury Tales, Chevy Chase, Idylls of the King, Paradise Lost. See also Ballad.

Essayists and Critics: Addison, Arnold, Bacon, Bagehot, Besant, Boswell, De Quincey, Darwin, Gosse, Hazlitt, Huxley, Hunt, Lamb, Dibdin, Johnson, Jerrold, Landor, Martineau, Pater, More, Percy, Quiller-Couch, Ruskin, Smith, Steele.

Novelists: Austen, Besant, Blackmore, Braddon, Bronte, Bulwer-Lytton, Bunyan, Burnett, Craik, Caine, Corelli, Crockett, Collins, Carroll, Cross, Defoe, De Morgan, Disraeli, Dickens, Doyle, Du Maurier, Edgeworth, Fielding, Gaskell, Galt, Hardy, Hewlitt, Haggard, Hawkins, Ingelow, Jerrold, Jenkins, Johnston, Kingsley, Kipling, Meredith, Mitford, Montagu, Martineau, Proctor, Porter, Reade, Richardson, Smollett, Sterne, Schreiner, Thompson, Trollope, Thackeray, Watson, Ward, Yonge.

Historians: Bryce, Buckle, Clarendon, Freeman, Froude, Geoffrey, Grote, Hallam, Lecky, Lingard, Macaulay, Mitford, Holinshed, Hume, Pepys, Strickland, Stubbs, Rawlinson.

Scientists, Physicians, Naturalists, etc.: Abernethy, Arkwright, Armstrong, Atwood, Boyle, Bacon, Bentham, Berkeley, Buckle, Banks, Crookes, Cavendish, Daniell, Dalton, Davy, Darwin, Dewar, Grenfell, Crompton, Faraday, Gilbert, Halley, Hooker, Huxley, Hunter, Harvey, Hobbes, Hargreaves, Jenner, Joule, Lockyer, Lewes, Lubbock, Lodge, Owen, Priestly, Lister, Mackenzie, Newton, Raleigh, Ray, Stephenson, Somerville, Selden, Spencer, Thompson, Watts, Wallace.

Philosophers: Bentham, Mill, Bacon, Malthus, Locke.

Jurists: Blackstone, Coke, Jeffreys, Woolsack.

Clergy: Baring-Gould, Becket, Bede, Burton, Collier, Cranmer, Fox, Heber, Herbert, Langton, Latimer, Laud, Newman J. H., Stanley A. P., Spurgeon, Taylor, Wesley, Whitefield, Wolsey.

Educators and Reformers: Arnold, Ascham, Thring, Howard, Wilberforce, Shaftesbury, Booth, Nightingale.

Miscellaneous Public Persons: Chesterfield, Fawkes, Cade, Ball, Fox, Owen, Howard, Kidd, Nash, Hampden, Hastings, Watt, Oates, Wren, Tyler, Rhodes, Wilberforce, Tyndale, Hoyle, Hill, Hilda, Darling.

Journalists and Publishers: Forbes, Sala, Caxton.

Noted Buildings: Crystal Palace, St. Paul's, Salisbury, Tower of London, Warwick Castle, Westminster Abbey, Windsor Castle. See also Canterbury, York, Winchester.

Antiquities: Agricola, Chester, Doomsday Book, Stonehenge, Watling Street.

Related Topics: Cabal, Budget, Buckingham, Bering Sea, Balmoral Castle, Scotland, Wales, Ireland, Channel Islands, Canada, Nova Scotia, India, Australia, New Zealand, United States.

Rulers and Royalty: Albert, Alfred the Great, Bothwell, Charles I and II, Boleyn,

Boadicea, Charles Edward Stuart, Cromwell, Edmund II, Edward I to VII, Edward the Elder, Edward the Confessor, Elizabeth, George I to V, Grey (Lady Jane), Harold I and II, Henry I to VIII, James I and VI, William I, III, IV, Mary I, Mary II, Margaret, Margaret (Princess), Margaret (of Anjou), Mary (Queen of Scots), Catharine (of Aragon).

EXPLOSIVES—

Dynamite, Greek Fire, Guncotton, Nitroglycerin, Nobel A. B., Powder.

FAIRS—

Bartholomew Fair, Crystal Palace, Centennial Exposition, Eiffel Tower, Exposition, Fair, Gild, Jamestown Exposition, Leipsic, Louisiana Purchase Exposition, Nijni-Novgorod, Pan-American Exposition, Seattle, World's Columbian Exposition.

FIRE—

Asbestos, Charcoal, Chimney, Coal, Flint, Gas, Heating and Ventilating, Hephaestus, Insurance, Matches, Oxygen, Parsees, Peat, Smelting, Smoke, Stove, Talc, Zoroaster.

FISHES—

Anchovy, Blue-fish, Carp, Catfish, Climbing Perch, Cod, Darters, Dogfish, Eel, Flounder, Flying-fish, Fly Shooter, Garfish, Gills, Goldfish, Grayling, Gudgeon, Haddock, Hake, Halibut, Herring, John Doree, Ling, Mackerel, Minnow, Mullet, Perch, Pike, Ribbon Fishes, Salmon, Sardines, Sawfish, Sculpin, Sea Horse, Shad, Shark, Sheepshead, Skate, Smelt, Sole, Stickleback, Sturgeon, Sunfish, Swordfish, Tarpon, Trout, Tunny, Turbot, Whitefish.

See also Aquarium, Billingsgate, Boat, Caspian, Caviare, Gaff, Gills, Great Lakes, Isinglass, Net, Spawn, Fertilizer.

FLORENCE—

Arno, Dante, Medici, Nightingale F., Savonarola.

FLORIDA—

For Products, Animals, and Plants, see Southern States under United States: Products, etc.

For Minerals, see Southern States under United States: Minerals.

Additional References: Everglades, De Soto, Ponce de Leon, Seminoles, Osceola, Pecan, Kaolin, Alligator, Pineapple, Orange.

FRANCE—

Area, Population, and Boundaries. See article France.

Surface and Waters: Loire, Pyrenees, Rhone, Seine, Cenis.

Animals and Plants: Chamois, Ibex, Bat, Silkworm, Bee, Mulberry, Oak, Fir, Birch, Beech, Mistletoe, Grape, Olive.

Minerals: Coal, Iron, Lead, Zinc, Salt, Kaolin, Clay.

Products: Wine, Silk, Pottery, Brandy, Eggs, Cereals, Butter, Sugar, Wool, Olive Oil, Champagne.

Cities, Towns, and Localities: Aix-la-Chapelle, Amiens, Avignon, Bordeaux, Boulogne, Brittany, Burgundy, Calais, Champagne, Chartres, Corsica, Douay, Fontainbleau, Havre, Landes, Ardennes, Limoges, Lyons, Marseilles, Nancy, Nantes, Navarre, Nice, Nimes, Orleans, Paris, Provence, Rheims, Rochelle, Rouen, St. Cloud, St. Etienne, Sevres, Tours, Treves.

See also Paris and Vicinity.

Race Elements: Albigenses, Basques, Celts, Chouan, Gaul, Huguenots, Normans.

Wars and Battles: Agincourt, Austerlitz, Crecy, Franco-Prussian War, Sedan, Bartholomew, Massacre of St.

French Revolution: Commune, Corday, Jacobin, Roland (Madame), Guillotine, Reign of Terror, Tale of Two Cities, Tricolor, Murat, Soult.

Court and Crown: Bourbon, Capetian, Charles Martel, Charlemagne, Clovis, Catharine, Dauphin, Carolus, Joan of Arc, Hundred Days, Catharine de Medici, Diamond Necklace, Francis, Girondist, Guillotine, Guise, Josephine, Louis, Louvre, Maintenon, Margaret, Marie Antoinette, Napoleon, Napoleon III, Octroi, Philip, Charles V, VII, IX, Louis I to XVIII.

French Biography:

a. Poets and Dramatists: Corneille, Molière, Racine, Villon, Voltaire, La Fontaine, Bergerac, Rostand. See also Roman de la Rose.

b. Novelists: Balzac, Daudet, Dumas, Gaboriau, Hugo, Maupassant, Sue, Verne, Zola, Musset, Le Sage.

c. Essayists: Alembert, Bossuet, Chateaubriand, Encyclopedia, Montaigne, Rabelais, Rousseau, Staël, Taine, Sieyès.

d. Historians: Froissart, Guizot, Lamartine, Rollin, Tocqueville.

e. Clergymen: Bossuet, Fénelon, Masillon.

f. Statesmen: Blanc, Clemenceau, Colbert, Cousin, Danton, Faure, Ferry, Gambetta, Marat, Mazarin, Mirabeau, Montesquieu, Necker, Richelieu, Robespierre, St. Etienne, Sieyès, Talleyrand, Thiers, Turgot, Favre, Genet, Clemenceau.

g. Scientists and Naturalists: Ampere, Buffon, Cuvier, De Candolle, Jussieu, Laplace, Lesseps, Lavoisier, Pascal, Bleriot, Jacquard, Pasteur, Lamarck, Arago, Mercator, Avogadro, Gay-Lussac, Reamur, Du Chaillu.

h. Painters, Musicians, Actors, etc.: Bernhardt, Blondel, Gounod, Breton, Bonheur, Millet, Meissonier, Poussin, Tissot, Rachel.

i. Philosophers and Educators: Abelard, Descartes, Montesquieu, Herbart, Rousseau, Cousin, Diderot, Braille, Proudhon, Anselm.

j. Soldiers and Sailors: Bayard, Conde, Dreyfus, Lafayette, MacMahon,

Murat, Soult, Montcalm, Cartier, Hennepin, Nicollet, La Salle, Champlain.

k. Financiers, Engineers, etc.: Girard, Mazarin, Necker, Turgot.

l. Miscellaneous: Coligny, Danton, Recamier, Rochefort, Tom Thumb.

FUR—

Astrakhan, Beaver, Bear, Ermine, Felt, Hat, Hudson Bay Company, Marten, Mink, Muskrat, Otter, Sable, Seal, Snowshoe.

See also list of Animals.

GEMS—

Agate, Amethyst, Beryl, Birthday Stones, Cameo, Carat, Chalcedony, Diamond, Earring, Emerald, Garnet, Lapis Lazuli, Onyx, Opal, Pearl, Pebble, Ring, Ruby, Sapphire, Taj Mahal, Topaz, Turquoise.

GEOGRAPHY—

Mathematical Geography: Altitude, Antipodes, East, Equator, Globe, Greenwich, Latitude, Longitude, Map, Tropic, West, Zone.

Physical Geography: Quicksand, Currents, Doldrums, Flood, Ignis Fatuus, Meteorology, Twilight, Wave, Avalanche, Bad Lands, Cave, Climate, Delta, Desert, Dune, Earthquake, Geyser, Glacier, Highlands, Mer de Glace, Natural Bridges, Piedmont, Rock, Rocking Stone, Seismograph, Snow Line, Soil, Steppe, Tides, Volcano.

Climate and Weather: Air, Blizzard, Chinook, Cloud, Cyclone, Dew, Fog, Frost, Hail, Heat, Humidity, Hurricane, Hygrometer, Rain, Rain Gauge, Simoon, Sirocco, Snow, Sunshine, Temperature, Tornado, Weather Bureau, Wind, Zero.

Grand Divisions: Africa, America, Asia, Australia, Europe.

Islands. See Index List of Islands. See Island.

Mountains. See Index List of Mountains by grand divisions. See Altitude.

Oceans: Atlantic, Pacific, Arctic Regions, Antarctic Regions, Indian Ocean, Icebergs, Currents, Bathometer, Monsoon, Trade Winds, Rain, Globigerina, Challenger Expedition, Fishes, Cetacea, Tortoises.

Lakes. See article Lake.

Rivers. See Index List of Rivers, also article on River.

Countries. See articles on the several countries; list under Continents.

Cities. See Index List of Cities; City statistics under countries and states.

Minerals. See Index List of Minerals.

Animals. See Index List of Animals.

Plants. See Index List of Plants.

Geographers: Guyot, Hakluyt, Heilprin, Humboldt, Maury, Mercator, Powell, Ptolemy, Ritter, Strabo.

GEORGIA—

For Products, Animals, and Minerals, see Southern States under United States: Products.

For Minerals, see Eastern States under United States: Minerals.

Additional References: Blue Ridge, Savannah, Pine, Rice, Cotton, Peach, Sherman.

GERMANY—

Area, Position, and Boundaries. See article Germany.

States: Prussia, Bavaria, Saxony, Würtemberg, Baden, Alsace-Lorraine, Mecklenburg, Brunswick, Darmstadt.

Surface and Waters: Alps, Danube, Black Forest, Elbe, Harz, Rhine.

Minerals: Coal, Iron, Clay, Zinc, Marble.

Plants: Oak, Poplar, Basswood, Pine, Fir, Hop.

Animals: Boar, Aurochs, Bear, Wolf, Fox, Badger, Hamster, Rat, Otter, Weasel, Squirrel, Dormouse, Hedgehog, Frog, Toad.

Products: Lumber, Cannon, Microscope, Steel, Cutlery, Acids, Clothing, Lace, Cereals, Potatoes, Pottery, Glass, Books, Beer, Wine, Hosiery.

Cities and Localities: Aachen, Alsace-Lorraine, Augsburg, Baden, Bayreuth, Berlin, Bingen, Blenheim, Bonn, Bremen, Breslau, Carlsbad, Chemnitz, Coblenz, Cologne, Constance, Danzig, Dresden, Dusseldorf, Ems, Frankfurt, Free Cities, Gothenburg, Gottingen, Hamburg, Hanover, Heidelberg, Heligoland, Hohenlinden, Jena, Kiel, Kronstadt, Leipsic, Lubeck, Mainz, Metz, Moselle, Münster, Munich, Nuremberg, Potsdam, Ratisbon, Smalkald, Strasburg, Stuttgart, Treves, Weimar, Wittenburg, Worms, Würtemberg, Zurich.

Domestic Animals. See statistics in article Germany.

Race, Elements: Wends, Goths, Slav.

Court and Crown: Aachen, Charles the Bold, Frederick II, Frederick Barbarossa, Frederick William, Frederick William I, Golden Bull, Hohenzollern, Maximilian, Otho, Potsdam, Sigismund, William.

Wars and Battles: Blucher, Franco-Prussian War, Hermann, Metz, Moltke, Seven Weeks' War, Thirty Years' War, Tilly, Waterloo.

Politics: Bismarck, Ems, German Empire, Smalkald, Stein.

German Reform: Anabaptists, Boniface, Constance, Erasmus, Herder, Huss, Jerome, Luther M., Lutherans, Melancthon, Wittenberg, Worms, Wartburg, Zwingli.

Musicians: Bach, Beethoven, Brahms, Schubert, Wagner, Schumann, Mozart, Mendelssohn, Handel, Strauss, Damrosch.

Scientists: Bunsen, Eschscholtz, Herschel, Humboldt, Helmholtz, Hartz, Koch, Nernst, Mergenthaler, Krupp, Liebig, Ritter, Virchow, Nordau, Fahrenheit, Fraunhofer, Ohm, Oswald.

Education and Philosophy: Albertus Magnus, Fichte, Francke, Halle, Froebel, Gymnasium, Kindergarten, Lassalle, Sturm, Marx, Mohr, Jahn, Basedow,

Herder, Schlegel, Hegel, Herbart, Kant, Liebnitz, Pestalozzi, Real Schulen, Schelling, Schopenhauer, Schiegel, University.

Historians and Poets: Auerbach, Durer, Faust, Freytag, Goethe, Grimm, Heine, Lessing, Ebers, Minnesingers, Mommsen, Niebelungenlied, Niebuhr, Richter, Schiller, Sachs, Klopstock, Sudermann, Hauptman, Uhland, Eginhard, Baedeker, Schliemann, Tauchnitz.

GOETHE—

Carlyle, Dorothea, Faust, Hermann, Literature, Mephistopheles, Schiller, Weimar.

GOLD—

Occurrence and Properties. See article Gold.

Deposits: Colorado, California, Nevada, Utah, South Dakota, Montana, Arizona, Idaho, Alaska, Yukon, Klondike, Canada, Mexico, Russia, India, Africa, Australia, Pyrites.

Preparation: Placer Mining, Mining, Drilling, Blasting, Assaying, Amalgam, Mercury, Mint, Gold Leaf, Alchemy, Philosopher's Stone.

Uses: Coin, Gilding, Cloth of Gold, Pinchbeck.

GREECE—

Surface and Waters: Aegean Sea, Alpheus, Archipelago, Olympus, Parnassus.

Divisions and Colonies: Alexandria, Arcadia, Attica, Boeotia, Constantinople, Corinth, Delos, Ephesus, Macedonia, Peloponnesus, Pergamus, Sparta, Sybaris, Syracuse, Thebes, Thrace.

Animals: Sponge, Starfish, Spider, Snail, Vulture, Chameleon, Tortoise, Eagle, Crane, Stork, Lark, Boar.

Plants: Wheat, Acanthus, Amaranth, Anemone, Arethusa, Asphodel, Daffodil, Gladiolus, Apple, Grape, Pear, Fig, Olive, Lemon, Pomegranate, Cypress.

Products: Currant, Olive Oil, Wheat, Wine.

Places of Historic Interest: Acropolis, Actium, Athens, Byzantium, Delphi, Marathon, Parthenon, Peiraeus, Salamis, Thermopylae.

Legendary History: Achilles, Aeneas, Agamemnon, Argonauts, Helen, Hercules, Hesiod, Theseus, Troy.

Literature:

a. Poetry and Fable: Aesop, Anacreon, Arion, Corinna, Hesiod, Hippocrates, Homer, Ibycus, Iliad and Odyssey, Pindar, Sappho, Theocritus.

b. Drama: Aristophanes, Aeschylus, Euripedes, Sophocles.

c. History and Oratory: Aeschines, Anabasis, Demosthenes, Grote, Herodotus, Mitford, Petrarch, Polybius, Thucydides, Xenophon.

d. Philosophy, inquiry as to nature of earth, air, fire, water, man, God, animal, and plant: Anaximander, Aristotle, Aspasia, Cynics, Democritus, Diogenes, Epicurus, Lucian, Plato, Seven Wise Men, Socrates, Sophists, Zenophanes.

e. Medicine: Galen, Hippocrates.

f. Mathematics and Science: Strabo, Pythagoras.

g. Painters and Sculptors, etc.: Apelles, Parrhasius, Zeuxis, Elgin Marbles, Phidias, Praxiteles, Pergamus, Caryatides, Aeginetan Marbles.

Government, Lawgivers, and Religion: Achaean League, Amphictyonic Council, Delphi, Lycurgus, Olympia, Ostracism, Pisistratus, Solon.

Statistics. See article Greece.

Statesmen and Soldiers: Alcibiades, Alexander, Aristides, Bozzaris, Epaminondas, Pericles, Themistocles.

Military and Naval Operations: Darius, Marathon, Persia, Phalanx, Xerxes, Miltiades, Leonidas, Alexander, Galley, Cimon, Mithridates, Erectheum, Philip.

Famous Greek Women: Hypatia, Helen, Aspasia, Xanthippe.

Architecture: Parthenon, Pnyx, Theseum.

Sculpture: Caryatides, Elgin Marbles, Pergamus, Praxiteles.

Painting: Apelles, Zeuxis.

Mythology—Classical: Acheron, Adonis, Aegina, Aegis, Aeolus, Aesculapius, Agamemnon, Ajax, Aktaeon, Alcestis, Alcmaeon, Alpheus, Amalthea, Amazons, Ambrosia, Amphion, Amphitrite, Andromeda, Anteros, Antilochus, Antiope, Aphrodite, Apollo, Apple of Discord, Arachne, Arethusa, Argonauts, Argus, Ariadne, Atalanta, Athene, Atlantis, Atlas, Atropos, Augean Stables, Bacchus, Baucis, Bellerophon, Boreas, Cadmus, Calliope, Callisto, Callirrhoe, Calypso, Cassandra, Castor and Pollux, Cecrops, Centaurs, Cerberus, Ceres, Ceyx, Chaos, Charon, Charybdis, Chimera, Chiron, Clio, Clytemnestra, Clytie, Cronus, Cybele, Cyclades, Cyclops, Cygnus, Daedalus, Danae, Danaus, Demeter, Deucalion, Dirce, Dryad, Echo, Elysium, Endymion, Epimetheus, Erebus, Euterpe, Fates, Furies, Gea, Galatea, Ganymede, Golden Fleece, Gorgon, Graces, Griffin, Hades, Harmonia, Harpy, Hecate, Hector, Hecuba, Helen, Helenus, Helios, Hercules, Hermes, Hero and Leander, Hesperides, Homer, Hera, Horae, Hydra, Hymen, Hyperborean, Hyperion, Io, Iphigenia, Iris, Jason, Loacoön, Lapithae, Leda, Lethe, Lotus Eaters, Medusa, Meleager, Melpomene, Menelaus, Mentor, Midas, Minos, Minotaur, Morpheus, Mors, Muses, Myrmidons, Naiads, Narcissus, Nausicaa, Nectar, Nemesis, Nereids, Nestor, Niobe, Nymphs, Nyx, Oceanus, Oedipus, Oenone, Olympus, Orestes, Orion, Orpheus, Pan, Pandora, Paris, Parnassus, Pegasus, Penelope, Perseus, Phaethon, Philomela, Phoenix, Pirithous, Pleiades, Pluto, Plutus, Polyhymnia, Poseidon, Priam, Prometheus, Psyche, Pygmalion, Pygmy, Pyr-

mus and Thisbe, Rhea, Rhoecus, Satyrs, Scylla and Charybdis, Selene, Sirens, Somnus, Sphinx, Styx, Tantalus, Tartarus, Thalia, Titans, Triton, Zeus. See under Virgil.

GREENLAND—

Arctic Regions, Denmark, Eskimo, Musk-ox, Peary, Seal, Walrus, Whale.

GUM—

Amber, Chicle, Kauri, Lac, Mastic, Tragacanth. See also Rubber.

HAIR—

Barber, Comb, Felt, Fur, Hair, Horn, Mohair, Reindeer, Wool.

HAWAII—

Area, Position, and Islands. See article Hawaii.

General Topics: Volcano, Irrigation, Coral, Honolulu, Cook Capt., Leprosy, Damien, Banana, Sugar, Pineapple, Coffee, Rice, United States, Cable, San Francisco, Pacific Ocean.

Statistics. See article Hawaii.

HAWTHORNE—

Bowdoin, Brook Farm, Marble Faun, Salem, Scarlet Letter. See also Emerson, Thoreau, Alcott.

HEBREWS—

Abraham, Absalom, Ark, Ashtoreth, Baal, Babylonian Captivity, Belshazzar, Bible, David, Disraeli, Ghetto, Israel, Jerusalem, Jews, Jordan, Josephus, Jubilee, Levite, Manna, Naboth, Nebuchadnezzar, Palestine, Pharoah, Pharisees, Red Sea, Rothschilds, Sadducees, Saul, Scapegoat, Scribes, Sinai, Solomon, Spinoza, Tabernacle, Zangwill, Bethlehem, Zion, Hirsch, Palestine, Jews, Cabala, Jesus Christ, Herod.

HEROISM—

Carnegie Hero Fund, Darling.

HOLIDAYS AND FESTIVALS—

Arbor Day, Christmas, Decoration Day, Good Friday, Hallowe'en, Mardi Gras, New Year's Day, Patrick Saint, Shrove, Thanksgiving Day, Bird Day, Palm Sunday, All Saints' Day, Ash Wednesday, All Fools' Day, Festivals.

See also article on Holidays.

HOLLAND—

See under Netherlands.

HOLMES, OLIVER WENDELL—

Algebra, Atlantic Monthly, Autocrat, Brownstone, Copley, Crocus, Elliot C. W., Flounder, Galen, Gull, Harvard, Katydid, Metaphor, Nautilus, Pun, Old Ironsides.

HOME ECONOMICS—

Furniture and Furnishing: Andiron, Bed, Broom, Buhl, Carpet, Chair, Fork, Furniture, Lamp, Mirror, Quilt, Rug, Tapestry.

Utensils: Brush, Carpet Sweeper, Insecticides.

Sanitation: Bacteria, Bedbug, Cockroach, Disinfectant, Drainage, Flea, Fly, Garbage, Heating, Hospital, Laundry, Lighting, Mosquito, Soap, Typhoid Fever, Waterworks. See also list of Diseases.

Food and Diet: Adulteration, Beef, Bread, Butter, Cereals, Cheese, Cold Storage, Eggs, Flour, Food, Gluten, Ice, Nut, Poison, Preserves, Proteids, Toast, Wages, Sausage, Albumins, Biscuit, Mutton, Pork, Saccharine. See Physiology, Diet. For Orchard Fruits, Small Fruits, and Garden Vegetables, see under Plants.

Clothing: Afghan, Balmoral, Bandana, Bloomers, Blucher, Bonnet, Boots and Shoes, Buttons, Cap, Cassock, Cloak, Collar, Corset, Crispin, Dolman, Doublet, Fan, Gaberdine, Glove, Hat, Hook and Eye, Mackintosh, Millinery, Moccasin, Plaid, Sabot, Sandal, Shawl, Shoes, Sweat-Shop, Tartan, Wellington, Costume, Fibers, Lace, Knitting, Sewing, Sewing Machine, Spinning, Thimble, Weaving, Leather. See also list of Fabrics under Textiles.

HORSE—

Pacer, Mustang, Pony, Shetland, Zebra, Mule, Bucephalus, Glanders, Horse Racing, Epsom, Derby, Tattersall's, Bonheur R., Bonner R., Lasso, Quagga, Botfly.

HUGUENOTS—

Coligny, Edict of Nantes, La Rochelle, Lyons, South Carolina, Walloon.

HUNGARY—

See Austria-Hungary. See also Budapest, Austria, Belgrade, Kossuth, Slav, Hun, Triple, Alliance.

History. See Austria.

HYDROGEN—

Properties: See article Hydrogen.

Presence: Ammonia, Beef, Egg, Firedamp, Starch, Sugar, Sun, Vegetables, Volcano, Water.

Use: Balloon, Heat.

ICELAND—

Arctic Regions, Denmark, Edda, Ericson L., Geyser, Goth, Greenland, Hecla, Heimskringla, Snorre Sturleson, Vinland.

IDAHO—

For Products, Animals, and Plants, see Northern States: Products, etc.

For Minerals, see Northern States under United States: Mineral Products.

Additional References: Snake River, Shoshone Falls, Irrigation, Mormons, Lewis and Clark Expedition, Nez Perces, Silver, Copper.

ILLINOIS—

For Products, Animals, and Plants, see Middle States under United States: Products, etc.

For Minerals, see Northern States under United States: Mineral Products.

Additional References: Lake Michigan, Chicago, Joliet, Elgin, Corn, La Salle, Kaskaskia, Marquette, Lincoln, Douglas, Black Hawk, Tecumseh, Whiskey, Corn, Potato, Pontiac.

INDIA—

Area, Position, and Boundaries. See article India.

Surface and Waters: Himalaya, Bengal, Deccan, Indus, Ganges, Irawadi.
Climate: Article India, Rainfall, Monsoon.
Minerals: Coal, Iron, Gold, Lead, Copper, Antimony, Ruby, Diamond.
Plants: Teak, Bamboo, Palm, Banyan, Sandalwood, Screw Pine, Poppy, Rice, Mango, Sugar-cane, Ginger, Pepper, Jute, Flax, Hemp, Cotton, Wheat, Indigo, Maize, Tea, Coffee, Rattan.
Animals: Tiger, Cobra, Buffalo, Zebu, Monkey, Elephant, Hyena, Jackal, Boar, Crocodile, Quail.
Productions and Domestic Animals. See statistics in article India.
Cities: Benares, Bombay, Calcutta, Delhi, Ellora, Golconda, Hyderabad, Lucknow, Madras, Pondicherry, Rangoon.
Art: Architecture, Ellora, Taj Mahal, Golconda, Cashmere, Temple.
Religious and Social Affairs: Buddha, Brahma, Christianity, Parsees, Thugs, Suttee, Eurasian, Brahmin, Juggernaut, Shah Jehan, Jejeebhoy, Rajah, Sikhs.
Literature and Learning: Sanscrit, Arithmetic, Vedas.
British Occupation: Nabob, Sepoy, Lucknow, Black Hole of Calcutta, Hyder Ali, Havelock, Hastings, Clive, East India Company, Kipling, Baluchistan.
History: Akbar, Aurungzebe, Durbar.

INDIANA—

For Products, Animals, and Plants, see Middle States under United States: Products, etc.
For Minerals, see Northern States under United States: Mineral Products.
Additional References: Corn, Potato, Petroleum, Gas, Ade, Harrison, Riley, Hay, Thompson, Eggleston, Tarkington, South Bend, Indianapolis, Wallace, Distilling, Beveridge, Wiley.

INDIANS—

Tribes: Algonquin, Apache, Assiniboin, Aztecs, Blackfeet, Cherokee, Cheyenne, Chickasaw, Chippewas, Choctaws, Comanche, Creeks, Dakota, Digger, Eskimo, Incas, Iroquois, Mohawks, Moqui, Navajo, Nez Perces, Pawnees, Pueblos, Seminoles, Shawnee, Shoshoni, Winnebagoes, Wyandotte.
Indians of Note: Black Hawk, Geronimo, Guess G., Hiawatha, Juarez, Logan, Montezuma, Osceola, Pocahontas, Pontiac, Powhattan, Red Jacket, Sequoia, Sitting Bull, Tecumseh, Brant, Massasoit.
Customs: Bow and Arrow, Buffalo, Calumet, Canoe, Catlin G., Cliff Dwellers, Deer, Fur, Indian Territory, Lacrosse, Medicine Man, Parkman, Pemmican, Portage, Remington, Reservation, Schoolcraft, Tanning, Tent, Tomahawk, Totem, Wampum, Wigwam.
Education: Carlisle Institute, Hampton Institute.
Indian Fighters: Bacon, Boone, Cody, Crockett, Crook, Custer, Harrison W. H., Kenton, Miles, Wayne.

INSECTS—

Bees and Their Relatives: Ant, Bee, Borers, Bumble Bee, Hornet, Ichneumon, Mason Bee, Sawfly, Wasp.
Beetles: Bookworm, Cotton Boll-weevil, Curculio, Deathwatch, Firefly, Glow-worm, Ladybug, Potato Beetle, Scarabaeus, Tumblebug, Weevil.
Flies: Botfly, Cattle Tick, Cranefly, Flea, Fly, Gadfly, Gnat, Hessian Fly, Horsefly, Jigger (flea), Midge, Mosquito, Sheep-tick, Tsetse.
Butterflies and Moths: Army Worm, Butterfly, Caterpillar, Codlin Moth, Cutworm, Moth, Silkworm.
Ant-Lions and Caddice Flies: Ant-lion, Caddice Fly.
Straight-Winged Insects: Cockroach, Cricket, Dragon Fly, Earwig, Grasshopper, Katydid, Locust, Mantis, Termites, Walkingstick.
Bugs: Aphis, Bedbug, Cicada, Cochineal, Electric Light Bug, Louse, Scale Insects, Squash Bug, Water Strider, Cockchafer,
See also articles on Insects, and on Antennae, Bordeaux Mixture, Cotton, Dobson, Entomology, Fruit, Gall, Insecticide, Paris Green, Shellac, Spraying, Wax.

INTERNATIONAL AFFAIRS—

Berlin Treaty, Clayton-Bulwer Treaty, Continental System, Field of Cloth of Gold, Genet, High Seas, Diplomatic Service, Hague Tribunal, International Law, International Peace Congress, Reciprocity, Tariff, Congress of Vienna, Neutrality, Pan-American Congress, X Y Z Papers.

IOWA—

For Products, Animals, and Plants, see Middle States under United States: Products, etc.
For Minerals, see Northern States under United States: Mineral Products.
Additional References: Corn, Oats, Potato, Marquette, Joliet, Louisiana, Black Hawk, Des Moines.

IRELAND—

Area, Position, and Population. See Ireland.
Surface and Waters: Shannon, Ulster, Killarney, Boyne, Peat, Bog, Giant's Causeway.
Minerals: Coal, Granite, Basalt, Limestone, Clay, Iron, Salt, Gypsum, Silver.
Animals: Wolf, Hound, Squirrel, Mouse, Hawk, Eagle, Owl, Crane, Pelican, Thrush, Cuckoo, Snipe, Salmon, Trout.
Plants: Oak, Fir, Willow, Hawthorn, Hazel, Apple, Pear, Strawberry, Shamrock.
Products: Oats, Potato, Turnip, Rye, Lace, Linen, Whiskey.
Towns: Balbriggan, Belfast, Blarney, Cork, Dublin, Kilkenny, Killarney, Limerick, Londonderry, Maynooth, Queenstown.

Noted Men: Carleton Wm., Emmet, Lever, Lover, Matthew, Moore T., O'Connell D., Patrick St., Parnell, Saint-Gaudens, Gilmore, Grattan, Yeats, Ussher, Farquhar, McCarthy, Boucicault.

Historical: Absentee Landlord, Bede, Boycott, Boyne, British Empire, Fenians, Henry II, Irish Famine, Jaunting Car, Molly Maguires, Scotland.

Statistics: See article Ireland.

IRON—

Occurrence and Properties. See article Iron.

Deposits: Minnesota, Michigan, Alabama, New York, New Jersey, Georgia, Tennessee, Canada, England, Scotland, Sweden, Germany, France, Russia, Belgium, Austria-Hungary, Spain.

Preparation: Mining, Smelting, Annealing, Steel, Pittsburgh, Galvanized Iron, Wire, Carbon, Bessemer, Carnegie, Krupp, Siemens.

Use: Armor, Armor Plate, Arms, Bridge, Cutlery, Elevator, Firearms, Locomotive, Monitor, Nail, Needle, Plow, Railroad, Skyscraper, Steam Engine, Steamship, Wagon.

IRVING—

Abbotsford, Catskill Mountains, Crayon, Jefferson, Ichabod Crane, Rip Van Winkle, Tarrytown, Westminster.

ISLANDS—

North America: Bahamas, Bermuda, Cuba, Greenland, Haiti, Jamaica, Key West, Newfoundland, Porto Rico, St. Pierre and Miquelon, Santa Catalina, Staten Island, Thousand Islands, Vancouver, Martinique, West Indies.

Europe: Anglesey, Azores, Balearic, Canary Islands, Capri, Channel Islands, Corsica, Crete, Elba, Faroe, Great Britain, Hebrides, Heligoland, Iceland, Ireland, Lofoden, Man, Orkney, Salamis, Sardinia, Shetland, Sicily, Spitzbergen, Wight.

Asia: Borneo, Ceylon, Cyprus, Formosa, Japan, Java, Philippine Islands, Saghalien, Singapore, Spice Islands, Spitzbergen, Sumatra.

South America: Falkland, Galapagos, Trinidad, Tierra del Fuego.

Australia: New Guinea, New Zealand, Tasmania, Australasia, Ascension.

Australasia: Ascension.

Africa: Mauritius, Madagascar, Madeira.

Oceanica: Fiji, Hawaii, Juan Fernandez, Midway Islands, Samoa, Tahiti, Caroline Islands.

ITALY—

Area, Position, and Boundaries. See article Italy.

Surface and Waters: Aetna, Como, Volcano, Stromboli, Vesuvius, Piedmont, Capri, Sardinia, Po, Tiber, Arno, Rubicon, Naples, Sicily, Avernus, Alps.

Minerals: Silver, Mercury, Marble, Sulphur, Iron.

Animals: Ibex, Chamois, Bear, Lynx, Scorpion, Tarantula, Porcupine, Eagle, Vulture, Asp, Anchovy, Coral, Sardine.

Plants: Oak, Chestnut, Pine, Fir, Poplar, Myrtle, Pomegranate, Agave, Grapes, Olive.

Productions: Cereals, Flour, Olive Oil, Wine, Hemp, Flax, Cotton, Tobacco, Lemon, Orange, Wool, Beef, Leather, Eggs, Glass, Cutlery, Violin, Cameo, Silk, Gloves, Hat, Braid, Furniture, Macaroni.

Cities: Bologna, Capua, Canova, Carrara, Cremona, Fiesole, Florence, Genoa, Leghorn, Messina, Milan, Naples, Padua, Palermo, Pisa, Pompeii, Ravenna, Rome, Turin, Venice, Verona.

Noted Men: Ariosto, Avogadro, Boccaccio, Canova, Cavour, Columbus, Dante, Emmanuel, Galileo, Garibaldi, Gregory, Lombroso, Machiavelli, Mazzini, Michelangelo, Petrarch, Raphael, Tasso, Amerigo Vespucci, Aquinas, Bruno F., Cabot, Guido Reni, Giotto, Galvani, Marconi, Marco Polo, Patti, Palestrina, Paganini, Borgia, Perugino, Rienzi, Rossetti, Salvini, Schiaparelli, Verdi, Veronese, Verazzano, Stradivarius, Leonardo Da Vinci, Angelico, Rubens, Savonarola, Titian, Medici.

History: Austria, Borgia, Caesar, Canossa, Carbonari, Elba, Etruria, Goths, Guelfs and Ghibellines, Hannibal, Herculaneum, Lombardy, Mafia, Medici, Napoleon, Odoacer, Pellagra, Pope, Rubicon, San Marino, Vandals, Theodoric, Attila, Triple Alliance, Congress of Vienna, Emanuel II. See also Rome and Roman Empire.

Manufactures, Occupations, Crops, Domestic Animals, and Education. See statistics under article Italy.

See also Rome and the Roman Empire.

JAPAN—

Area and Position. See article Japan.

Surface and Waters: Saghalien, Formosa, Korea, Volcano. See also article Japan.

Minerals: Coal, Iron, Tin, Copper, Gold, Silver, Lead, Petroleum, Agate.

Animals: Monkey, Hyena, Badger, Flying Squirrel, Lark, Nightingale, Pheasant, Cormorant, Butterfly, Moth, Trout, Tunny, Coral, Lobster, Oyster.

Plants: Pine, Cedar, Fir, Oak, Chestnut, Walnut, Mulberry, Bamboo, Chrysanthemum.

Products: Sugar, Rice, Millet, Apple, Peach, Vegetables, Pepper, Silk, Lacquer, Steel, Paper, Mirror, Fan, Doll, Porcelain.

Cities: Nagasaki, Osaka, Yeddo, Tokio, Yokohama, Seoul.

History: Ancestor Worship, Chinese Empire, Hearn, Ito, Jinrikisha, Korea, Literature, Manchuria, Perry, Port Arthur, Seoul, Shintoism, Yen, Ainos, Russo-Japanese War, Shinto, Samurai.

See also Chopsticks.

Manufactures, Occupations, Crops, Domestic Animals, and Education. See statistics under Japan.

JEFFERSON, THOMAS—
Declaration of Independence, Democratic Party, Lewis and Clark Expedition, Louisiana Purchase, Virginia.

JOHNSON, DR. SAMUEL—
Boswell, Chesterfield, Dictionary, Garrick, Goldsmith, Happy Valley, Rambler, Rasselas, Shakespeare, Westminster Abbey.

KANSAS—
For Products, Animals, and Plants, see Middle States under United States: Products, etc.
For Minerals, see Southern States under United States: Mineral Products.
Additional References: Corn, Wheat, Packing House, Salt, Louisiana Purchase, Santa Fe, Kansas-Nebraska Bill, Brown J., Kansas City, Missouri, Petroleum.

KEATS—
Adonais, Endymion, Eve of St. Agnes, Grasshopper, Literature (English), Shelley, Sonnet.

KENTUCKY—
For Products, Animals, and Plants, see Southern States under United States: Products, etc.
For Minerals, see Southern States under United States: Mineral Products.
Additional References: Limestone, Mammoth Cave, Stalactite, Petroleum, Tobacco, Whiskey, Blue Grass, Horse, Cattle, Shawnee, Boone, Carson, Clay, Louisville, Breckenridge, Allen J. L., Clark G. R., O'Hara.

KIPLING—
Fiction, British Empire, Seal.

LABOR—
Apprentice, Burns J., Child Labor, Coxey, Dock, Factory System, Federation, Guild, Gompers, Knights of Labor, Labor Bureau, Labor Day, Strike, Sweat-Shop, Trades Union, Wages, Carpenter, Powderly, Mitchell, Convict Labor, Debs, Leclaire.

LAKES—
North America: Athabasca, Erie, Great Lakes, Great Salt Lake, Huron, Michigan, Ontario, Superior, Tahoe, Chautauqua, Salton Sea, Lake Champlain, Great Bear Lake, Great Slave Lake.
South America: Titicaca.
Europe: Como, Constance, Geneva, Killarney, Ladoga, Lucerne, Zurich, Caspian Sea, Black Sea, Sea of Azov.
Asia: Aral, Baikal, Caspian Sea, Dead Sea.
Africa: Nyanza, Tanganyika, Tchad, Victoria.

LANGUAGE—
Dialect, Esperanto, Etymology, Grammar, Plattdeutsch.

LAW—
Absentee Landlord, Abstract of Title, Act of God, Adoption, Alibi, Alien, Annuity, Arbitration (International), Arson, Asylum, Attorney-General, Bail, Ban, Bankruptcy, Benefit of Clergy, Blackstone, Blue Laws, Band, Burglary, Cabala, Chief Justice, Code, Coke, Compurgation, Constitution, Contract, Copyright, Corn Laws, Corporation, Courts of Law, Deed, Ex Post Facto Law, Extradition, Habeas Corpus, Hammurabi, Indictment, Injunction, Inns of Court, International Law, Judge, Jury, Justinian, License, Lien, Lynch Law, Mandamus, Mortgage, Notary, Oath, Ordeal, Pale, Patent, Personal Property, Poor Laws, Promissory Note, Punishment, Pure Food Law, Rent, Salic Law, Search Warrant, Sheriff, Slander, Supreme Court, Torrens' System, Trade Mark, Vigilance Committee.

LEAD—
Occurrence and Properties. See article Lead.
Deposits: Colorado, Utah, Idaho, Montana, Arizona, Missouri, Canada, Mexico, Spain, Germany, France, Italy, Belgium, Greece, Austria, Hungary, Australia, Galena.
Preparation: Mining, Smelting.
Uses: Ammunition, Babbitt, Type, Paint, White Lead, Pewter, Alloy, Solder, Pencil.

LEATHER—
Alligator, Buckskin, Galls, Glove, Morocco, Parchment, Shagreen, Sumac, Tannin.

LIGHT—
Acetylene, Aurora Borealis, Blindness, Blue, Bunsen, Camera Lucida, Candle, Color, Daguerreotype, Dalton, Electricity, Eye, Finsen, Green, Lamp, Lighthouse, Magic Lantern, Microscope, Oil, Petroleum, Silhouette, Spectacles, Spectroscope, Spectrum, Stereoscope, Telescope, Tungsten, Yellow.

LINCOLN—
Black Hawk, Douglas, Emancipation Proclamation, Gettysburg, Kentucky, Punch, Stephens, Whitman.

LITERATURE—
Academy, Acrostic, Allegory, Americanism, Anagram, Anthology, Arcadia, Ballad, Bard, Bible, Bibliotheke National, Blank Verse, Burlesque, Chevy Chase, Conundrum, Dialect, Eclogue, Elegy, Epic, Epigram, Essay, Fiction, History, Humor, Idyll, Lyric, Manuscripts, Minnesingers, Miracle Plays, Novel, Ode, Parody, Pastoral, Piers Plowman, Poetry, Proverb, Pseudonym, Pun, Realism, Reynard, Sonnet, Troubadours.
See article Literature, a subordinate article for each nation of literary note. Also Drama and Dramatists.

LOGIC—
See Rhetoric, Thinking.

LONDON AND VICINITY—
Area, Population, Traffic, and Statistics. See article London.

Districts and Suburbs: Chelsea, Derby, Epping Forest, Epsom, Greenwich, Hampton Court, Kensington, Kew, Lambeth Palace, Windsor.

Streets, Parks, and Memorials: Albert (Prince), Charing Cross, Cleopatra's Needle, Fleet, Hyde Park, Lombard Street, Pall Mall, Rotten Row, Strand.

Bridges: Blackfriars, London Bridge. See also Thames.

Markets: Billingsgate, Covent Garden, Quaritch, Tattersall's.

Places of Interest: Bank of England, British Museum, Christ's Hospital, Crystal Palace, Guildhall, Inns of Court, Mansion House, Parliament, Record Office, St. Paul's, Scotland Yard, Steelyard, Tower of London, Westminster Abbey, Newgate.

Persons: Addison, Carlyle, Dickens, Edward VII, Goldsmith, Hogarth, Johnson Dr. S., Jonson B., Peel, Pitt, Shakespeare, Spurgeon, Steele, Thackeray, Victoria, Whittington, Wren Sir C., Zangwill.

See also Bedlam, Bridewell, Cockney, Exposition, Globe Theater, London Company.

LONGFELLOW, HENRY WADSWORTH—

Acadia, Agassiz, Alden, Asphodel, Augustine, Beads, Beetle, Bowdoin, Bruges, Chestnut, Clock, Custer, Cypress, Elysium, Evangeline, Forget-me-not, Harvard, Hawthorne, Hedgehog, Hiawatha, Standish M., Minnehaha, Minnesingers, Mockingbird, Notary, Pipestone, Porcupine, Pyramid, Rhone, Spanish Moss, Minute Man, Literature (American).

LOUISIANA—

For Products, Animals, and Plants, see Southern States under United States: Products, etc.

For Minerals, see Southern States under United States: Mineral Products.

Additional References: Gulf of Mexico, Pecan, De Soto, Marquette, Creole, New Orleans, Jefferson, Jackson, Louisiana Purchase, Tulane University, Audubon, Cable, Acadia, Electoral Commission, Butler B., Sugar-cane, Molasses, Cotton.

LOWELL, JAMES RUSSELL—

Aladdin, Atlantic Monthly, Bigelow Papers, Birch, Bluebird, Bobolink, Cass, Cervantes, Chipmunk, Commemoration Ode, Cooper, Dandelion, Ermine, Holmes, Indian Summer, Irving, June, Landor, Lincoln, Parnassus, Rhoecus, Vision of Sir Launfal, Nature Study, Garrison.

LUTHER, MARTIN—

Augsburg, Bible, Erasmus, Hymn, Lutherans, Melancthon, Reformation, Ring (cut), Wartburg, Wittenberg, Worms.

MACAULAY, THOMAS BABINGTON—

Bristol, Boswell, Bunyan, Cavalier, Castor and Pollux, Catholic Church, Hastings W., Jesuits, Milton, Puritan, Swift, Westminster Abbey, William III.

MACHINES AND DEVICES—

Air Brake, Air Gun, Airship, Anemometer, Aneroid, Automaton, Balloon, Bathometer, Calculating Machine, Clepsydra, Clock, Cyclometer, Escalator, Fire Engines, Forge, Fork, Gas Engines, Governor, Gyroscope, Hourglass, Hydraulic Press, Hydraulic Ram, Locomotive, Milking Machine, Motor, Moving Pictures, Mower, Pedometer, Printing, Sand Blast, Seismograph, Semaphore, Threshing.

MAINE—

For Products, Animals, and Plants, see Northern States under United States: Products, etc.

For Minerals, see Eastern States under United States: Mineral Products.

Additional References: Cod, Pine, Prohibition, Verrazzano, Blaine, Reed, Dow, Gough, Gail Hamilton, Massachusetts, Lumber, Bowdoin.

MARYLAND—

For Products, Animals, and Plants, see Southern States under United States: Products, etc.

For Minerals, see Southern States under United States: Mineral Products.

Additional References: Chesapeake Bay, Potomac, Baltimore, Annapolis, Mason and Dixon's Line, Cumberland Road, Star-Spangled Banner, Maryland, My Maryland, Catholics, Johns Hopkins University, Canning, Oyster.

MASSACHUSETTS—

For Products, Animals, and Plants, see Eastern States under United States: Products, etc.

For Minerals, see Eastern States under United States: Mineral Products.

Additional References: Boots and Shoes, Textiles, Andover, Boston, Concord, Lexington, Lynn, Lowell, Waltham, Cape Cod, Cod, Hoosac, Merrimac, Adams J. Q., Adams S., Boston Tea Party, Hancock, Franklin B., Harvard, Hutchinson, Pilgrim, Puritan, Shay's Rebellion, Sumner, Wayne, Webster, Wellesley, Winthrop, Smith College, Phipps, Pierce, Williams College, Choate, Bills of Rights, Maine, Cotton, Williams.

MATHEMATICS—

Alines, Progression, Proportion, Quantity, Zero, Calculus, Algebra, Arithmetic, Axiom, Circle, Cone, Cube, Doubling the Cube, Euclid, Geometry, Hexagon, Napier J., Newton I., Pons Asinorum, Somerville M., Triangle, Trigonometry, Weights and Measures, Calculating Machine, Metric System, Solar System, Mensuration.

MEDICINE—

Psychotherapy, Materia Medica, Pathology, Pepsin, Pharmacy, Allopathy, Antitoxin, Catgut, Chalybeate Springs, Alchemy, Disinfectant, Drugs, Hospital, Osteopathy, Homeopathy, Disease, Bacterium, Surgery. See also medicinal plants under Plants; Chemistry, names of diseases.

MERCURY—
Airpump, Alchemy, Amalgam, Barometer, Chemistry, Cinnabar, Gold, Placer Mining, Poisons, Thermometer, Vermilion, Boiling, Quicksilver.

MEXICO—
Area and Position: See article Mexico.
Surface and Waters: Rocky Mountains, Popocatepetl, Rio Grande, California (Gulf of), Yucatan, Chapultepec.
Minerals: Coal, Iron, Silver, Gold, Zinc, Copper, Granite, Marble, Gypsum, Opal, Emerald, Agate, Topaz.
Animals: Jaguar, Puma, Bear, Coyote, Beaver, Mink, Otter, Monkey, Tapir, Sloth, Peccary, Iguana, Alligator, Boa Constrictor, Rattlesnake, Trogon, Parrot, Turkey, Hummingbird, Mockingbird, Scorpion, Tarantula, Oyster, Tunny.
Plants: Oak, Pine, Mahogany, Ebony, Rosewood, Rubber (tree), Guayule, Sarsaparilla, Agave, Jalap, Vanilla.
Products: Coffee, Sisal, Cattle, Rubber, Sugar, Flour, Rice, Cotton, Tobacco, Wine, Cigars, Cochineal, Chicle, Corn, Cacao, Timber, Metals.
Towns: Mexico, Monterey, Vera Cruz, Santa Anna.
History: Juarez, Aztecs, Mexico, Iturbide, Chapultepec, Scott W., Diaz, Cortez, Maximilian, Pulque, South America, Gadsden Purchase, Madero, Pueblos, Taylor, New Mexico.
Statistics: See article Mexico; Lower California.

MICHIGAN—
For Products, Animals, and Plants, see Northern States under United States: Products, etc.
For Minerals, see Northern States under United States: Mineral Products.
Additional References: Great Lakes, Iron, Copper, Lumber, Furniture, Corn, Oats, Apple, Drugs, Jesuits, Peach, Marquette, Nicollet, Pontiac, Northwest Territory, Ordinance of 1787, Ann Arbor University, Adventists, Pictured Rocks, Detroit.

MILITARY—
Weapons: Air-gun, Arms, Battering Ram, Bayonet, Blowgun, Blunderbuss, Boomerang, Bullet, Cannon, Cartridge, Catapult, Chassepot, Colt, Dum-dum Bullet, Firearms, Flint, Gatling Gun, Javelin, Krupp, Musket, Rifle, Saber, Shell, Sling, Sword, Testudo, Torpedo, Arquebus, Projectiles.
Accouterment: Armor, Hauberk, Haversack, Helmet, Shield, Tent.
Fortifications: Blockhouse, Castle, Fort, Gabion, Vauban, Wall of Antoninus.
Officers: General, Major, Quartermaster. See also Spy.
Organizations: Army, Army of the United States, Artillery, Brigade, Cavalry, Free Lances, Guerilla, Legion, Mamelukes, Militia, Phalanx, Sepoy, Wapenshaw, National Guard.
General Information: Aldershot, Ammunition, Annapolis Academy, Archery, Arsenal, Armistice, Beacon, Broad Arrow, Champion, Court Martial, Daughters of the American Revolution, Duel, Fist-Law, Furlough, God's Truce, Grand Army of the Republic, Grotius, Hague Tribunal, Monitor and Merrimac, Mutiny, Pension, Siege, Soldiers' Home, Sons of Veterans, United Confederate Veterans, West Point.

MILTON, JOHN—
Arthur, Bog, Calisto, Cassiopeia, Chaos, Circe, Comet, Comus, Cromwell, Cynosura, Daisy, Elysium, Hades, Lycidas, Macaulay, Mammon, Milky Way, Nymph, Paradise Lost, Satan, Sonnet.

MINERALS—
Metals: Aluminum, Antimony, Barium, Bismuth, Cadmium, Calcium, Chromium, Cobalt, Copper, Glucinum, Gold, Iridium, Iron, Lead, Lithium, Magnesium, Manganese, Mercury, Nickel, Platinum, Potassium, Radium, Rubidium, Silver, Steel, Tin, Tungsten, Uranium, Zinc.
Stones: Asbestos, Basalt, Brownstone, Chalk, Feldspar, Flint, Granite, Graphite, Gypsum, Limestone, Marble, Mica, Obsidian, Pebble, Quartz, Sandstone, Slate, Talc, Conglomerate, Mica, Schist, Trap, Jade, Porphyry. See also Quarry.
Ores: Blende, Cinnabar, Pyrites.
Gems: Agate, Alabaster, Amethyst, Chalcedony, Diamond, Emerald, Garnet, Lapis Lazuli, Opal, Ruby, Sapphire, Topaz, Turquoise, Jewelry, Cameo.
Abrasives: Buhr, Corundum, Emery, Grindstone, Whetstone.
Earths: Alkali, Clay, Kaolin, Ochre, Phosphate, Pumice, Sand, Umber, Shale. See also Silicon and Humus.
Earthenware: Cement, Concrete, Pottery, Porcelain, Sevres.
Mining: Boring, Calumet, Carnegie, Choke-Damp, Cornwall, Damps, Demidoff, Placer Mining, Safety Lamp.
Mineral Waters: Aachen, Baden, Carlsbad, Colorado Springs, Ems, Hot Springs, Vichy.
Arts: Alloy, Amalgam, Annealing, Asphalt, Bitumen, Brimstone, Bromine, Bronze, Calomel, Casting, Coin, Copperas, Lime, Mint, Pewter, Pinchbeck, Plumbago, Salt, Solder, Steel, Bell, Brass, Gold, Silver, Mercury.
General Terms: Metals, Blowpipe, Fossils, Mining, Mineralogy, Mineral Products of the United States, Petrified Forest, Metallurgy, Assaying.

MINNESOTA—
For Products, Animals, and Plants, see Northern States under United States: Products, etc.
For Minerals, see Northern States under United States: Mineral Products.
Additional References: Itasca, Minnehaha, Gopher, Lake Agassiz, Golden Rod, Lumber, Flour, Minneapolis, St. Paul, Duluth,

Hennepin, Nicollet, Carver, Cass, Dred Scott, Dakota, Chippewa, Schoolcraft, Corn, Lady's Slipper, Iron, Forestry, Lumbering.

MISSISSIPPI—

For Products, Animals, and Plants, see Southern States under United States: Products, etc.

For Minerals, see Southern States under United States: Mineral Products.

Additional References: De Soto, Marquette, La Salle, Creek, Secession, Davis, Lamar, Grant, Cotton, Holly, Pecan.

MISSISSIPPI RIVER—

Source and Tributaries: Itasca, Missouri River, Red River.

Cities: Minneapolis, St. Paul, St. Louis, Memphis, New Orleans, Cairo, Ill.

States:

a. Right Bank: Minnesota, Iowa, Missouri, Arkansas, Louisiana.

b. Left Bank: Minnesota, Wisconsin, Illinois, Kentucky, Tennessee, Mississippi, Louisiana.

Explorers: De Soto, Joliet, Marquette, La Salle, Hennepin, Cass, Carver, Schoolcraft.

MISSOURI—

For Products, Animals, and Plants, see Middle States under United States: Products, etc.

For Minerals, see Southern States under United States: Mineral Products.

Additional References: Louisiana Purchase Exposition, Missouri Compromise, Santa Fe, Shaw's Garden, St. Louis, Kansas City, St. Joseph, Corn, Grouse, Strawberry, Boone, Louisiana Purchase, Zinc, Ozark Mountains, Apple.

MOHAMMED—

Mohammedanism, Arabia, Mecca, Mosque, Koran, India, Islam, Turkey, Medina, Moors, Hegira.

MONEY AND FINANCE—

Coins and Currency: Beaver, Bullion, Coin, Cowry, Denarius, Dime, Dollar, Farthing, Gold, Greenbacks, Groat, Guinea, Legal Tender, Money, Nickel, Numismatics, Obolus, Paper Money, Penny, Picayune, Pound, Rupee, Ruble, Scudo, Shilling, Sequin, Wampun, Yen.

Collateral: God's Penny, Promissory Note, Stocks, Bonds, Mortgage.

Establishments: Bank, Bank of England, Clearing House, Mint, Pawnbroker, Postal Savings Banks, Savings Banks, Stock Exchange, Tally, Wall Street. See also Safe.

Theories and Schemes: Annuity, Bimetalism, Counterfeiting, Credit Mobilier, Gresham's Law, Interest, Letters of Credit, Lottery, Mississippi Bubble, Pension, South Sea Bubble, Tontine, Treasure Trove, Trust, Discount, Draft, Check, Tariff.

Financiers: Astor, Carnegie, Cooke, Croesus, Gould, Hamilton, Harriman, Law J., Mazarin, Midas, Morris R., Necker J., Rockefeller, Rothschild, Sherman, Turgot, Vanderbilt. See also Gifts, Mammon, Millionaire, Mortgage.

Additional Reference: Black Friday.

MONTANA—

For Products, Animals, and Plants, see Northern States under United States: Products, etc.

For Minerals, see Western States under United States: Mineral Products.

Additional References: Silver, Lead, Gold, Buffalo, Prairie Dog, Trout, Sagebrush, Wood, Dairy Products, Lewis and Clark Expedition, Butte, Great Falls, Custer, Nez Perces, Miles N.

MOUNTAINS—

North America: Cascades, Catskill, Cordilleras, Katahdin, Popocatepetl, Rocky Mountains, Selkirk, Appalachian, White Mountains. See also Altitude for highest point in each state.

South America: Andes, Chimborazo, Cordilleras, Cotopaxi, Aconcagua.

Europe: Alps, Apennines, Blanc, Bernard, Brenner Pass, Carpathians, Cheviot Hills, Mount Aetna, Matterhorn, Harz, Hecla, Jungfrau, Olympus, Parnassus, Rigi, St. Gotthard, Simplon, Ural, Vesuvius, Stromboli.

Asia: Ararat, Everest, Himalaya, Khyber Pass, Lebanon, Pamir, Sinai, Carmel, Fujiyama.

Africa: Atlas, Kilimanjaro.

Antarctic Regions: Erebus.

MUSIC—

Theory: Sound, Pitch, Accent, Harmonics.

Hymns and Songs: Ben Bolt, Dixie, God Save the King, Hail Columbia, Lohengrin, Marseillaise, Maryland, My Maryland, Messiah, Parsifal, Ranz de Vaches, Stabat Mater, Tannhauser, Te Deum, Yankee Doodle.

Musical Instruments:

a. Percussion: Bell, Castanets, Chime, Drum, Tambourine.

b. Stringed: Lyre, Banjo, Mandolin, Catgut, Guitar, Harp, Harpsichord, Jew's Harp, Lute, Piano, Player Piano, Violin, Aeolian Harp, Zither. See also Phonograph, Graphophone.

a. Wind: Accordion, Bagpipe, Fife, Flute, Oboe, Hurdy-gurdy, Organ, Trombone, Trumpet, Clarionet.

Musicians and Composers: Amphion, Bach, Beethoven, Bull, Brahms, Chopin, Damrosch, De Koven, Dvorak, Gilmore, Gounod, Grieg, Handel, Haydn, Key F. S., Lind J., Liszt, Marsyas, Mendelssohn, Meistersingers, Mozart, Nordica, Paderewski, Paganini, Palestrino, Patti, Schumann, Schubert, Sousa, Cecilia, Strauss, Stradivarius, Terpsichore, Troubadour, Thomas T., Wagner.

See also Choir, Quartet, Opera, Orchestra, Bayreuth, Cantata, Oratorio, Symphony.

MYTHOLOGY, NORSE—
Aegir, Aesir, Alfheim, Asgard, Aske, Baldur, Choosers of the Slain, Cobold, Edda, Frey, Freya, Frigg, Gladsheim, Hela, Jötunheim, Loki, Midgard, Niffleheim, Norns, Odin, Ragnarök, Thor.

NAPOLEON—
Austerlitz, Battle of Nations, Bernadotte, Blucher, Bonaparte, Code, Corsica, France, French Revolution, Holy Alliance, Josephine, Legion of Honor, Leipsic, Louisiana Purchase, Metternich, Moscow, Murat, Ney, Paris, Palindrome, St. Helena, Talleyrand, Waterloo.

NAVIGATION—
Craft: Airship, Boat, Canoe, Catamaran, Clipper, Coracle, Galleon, Gondola, Great Eastern, Houseboat, Galley, Junk, Lifeboat, Steamboat, Steamship, Yacht.
Nautical Supplies: Anchor, Ballast, Bulkhead, Compass, Hammock, Hawse, Life Preserver, Log, Log-Book, Oakum, Sail, Tar, Turpentine.
Power: Steam, Turbine, Wind.
Harbor Facilities: Buoy, Dock, Dredging, Ferry, Lighthouse, Life-Saving Service, Signals.
Information: Barnacle, Breakwater, Calking, Canal, Elevator, Liverpool, Mermaid, Lloyd's, London, Regatta, Scylla and Charybdis, Teredo, Tides, Tonnage, Piracy.

NAVY—
Anchor, Annapolis, Naval Academy, Armor Plate, Battleship, Blockade, Commodore, Dewey, Dock, Dreadnought, Ericsson, Kronstadt, Marines, Monitor and Merrimac, Navy, Old Ironsides, Signals, Submarine.

NEBRASKA—
For Products, Animals, and Plants, see Middle States under United States: Products, etc.
For Minerals, see Northern States under United States: Mineral Products.
Additional References: Rain, Irrigation, Artesian Wells, Buffalo, Osage, Coyote, Grass, Corn, Butter, Eggs, Alfalfa, Sugar Beet, Louisiana Purchase, Kansas-Nebraska Bill, Grange, Dakotah, Cheyenne, Arbor Day, Omaha, Packing House, National Corn Exposition.

NEGRO—
Douglas F., Dunbar, Emancipation Proclamation, Guinea, Liberia, Slave, Turner, Tuskegee, Washington B. T.

NETHERLANDS—
Area and Position. See article Netherlands.
Surface and Waters: North Sea, Dune, Canal, Rhine, Zuider Zee, Windmill, Scheldt.
Minerals: Coal, Clay, Limestone.
Animals: Stork, Pelican, Herring, Oyster.
Plants: Oak, Birch, Beet.
Products: Sugar, Rye, Oats, Potato, Cheese, Butter, Beef, Eggs, Lace, Linen, Beer, Pipe, Pottery, Glass, Honey, Seeds.
Cities: Amsterdam, Delft, Haarlem, Hague, Limburg, Leyden, Rotterdam, Utrecht.
Persons of Note: Hoff, Spinoza, Alma-Tadema, Franz-Hals, Munkacsy, Van Dyke, Wilhelmina, Ruysdael, Boerhaave, Hobbema, Jansen.
History: Alva (Duke of), Holland, William the Silent, Congress of Vienna, Peace of Westphalia, Huygens, William III, Charles V, Belgium, Dutch, Dutch East Indies, Literature, Dutch Reformed Church, Flanders, Rembrandt, Grotius, Motley J., Maartens M. See Pilgrims.

NEVADA—
For Products, Animals, and Plants, see Northern States under United States: Products, etc.
For Minerals, see Western States under United States: Mineral Products.
Additional References: Great Basin, Borax, Agate, Marble, Carson, Alfalfa, Wool, Gold, Copper, Silver.

NEW HAMPSHIRE—
For Products, Animals, and Plants, see Northern States under United States: Products, etc.
For Minerals, see Eastern States under United States: Mineral Products.
Additional References: Hawk, Eagle, White Mountains, Phillips, Dartmouth College, Webster, Chase, Pierce, Dix, Greeley, Butler, Putnam, Granite, Lumbering.

NEW JERSEY—
For Products, Animals, and Plants, see Northern States under United States: Products, etc.
For Minerals, see Eastern States under United States: Mineral Products.
Additional References: Delaware, Blue Ridge, Hudson, Peach, Asbury Park, Hoboken, Jersey City, Newark, Princeton, Trenton, Silk, Sewing Machine, Celluloid, Washington, Blueberry, Sweet Potato, Cooper, Corporation.

NEW MEXICO—
For Products, Animals, and Plants, see Southern States under United States: Products, etc.
For Minerals, see Southern States under United States: Mineral Products.
Additional References: Rio Grande, Sagebrush, Cactus, Peach, Santa Fé, Coronado, Cliff Dwellers, Wallace L., Irrigation, Alfalfa, Gadsden Purchase, Silver, Zuni, Albuquerque, Navajo Indians.

NEWSPAPERS AND PERIODICALS—
Advertisement, Associated Press, Atlantic Monthly, Blackwoods, Blackstone, Bonner, Curtis, Dana, Dial, Greeley, Holland J. G., Jeffrey, Keenan, Nast, Newspaper, Periodical, Punch, Scribner's, Spectator.

NEW YORK—
For Products, Animals, and Plants, see Northern States under United States: Products, etc.

For Minerals, see Eastern States under United States: Mineral Products.
Additional References: Adirondack, Albany, Albany Congress, Albany Regency, Amsterdam, Apple, Arthur, Buffalo, Burgoyne, Burr, Catskill, Camera, Champlain, Chautauqua, Cheese, Cleveland, Clinton, Cooper J. F., Cornell, Depew, Dix, Erie, Erie Canal, Greeley, Gypsum, Hamilton, Hudson, Hughes, Jay, Knitting, Know Nothing Party, Mineral Waters, New York, Niagara, Ontario, Patroon, Rochester, Rockefeller, Roosevelt, Salt, St. Lawrence, Sing Sing, Seward, Stuyvesant, Sugar, Ticonderoga, Tilden, Troy, University, Van Buren, Verrazano, Walloon, Waterpower, Waterworks, West Point.

NEW YORK CITY AND VICINITY—
Localities, Buildings, etc.: Bank, Battery, Broadway, Brooklyn, Central Park, Cleopatra's Needle, Columbia University, Coney Island, Madison Square Garden, Pratt Institute, Customs, Gotham, Hall of Fame, Hell Gate, Hoboken, Hudson River, Jersey City, Liberty (Statue of), Long Island, Navy Yard, Staten Island, Suspension Bridge, Sweat-Shop, Tarrytown, Wall Street, York, Tunnel, Park, Printing, Commerce.
Noted Persons: Astor, Beecher, Bonner, Bryant, Cooke, Cooper, Dana, Drake, Grant, Greeley, Halleck, Harriman, Hoe, Irving, Jay, Nast, Talmage, Tilden, Tweed, Vanderbilt. See also Tammany Society.

NILE—
Abyssinia, Albert Nyanza, Alexandria, Cleopatra, Cleopatra's Needle, Cairo, Crocodile, Delta, Desert, Edfu, Egypt, Ethiopia, Gordon, Herodotus, Hippopotamus, Irrigation, Lotus, Papyrus, Sahara, Sudan, Speke, Suez Canal, Thebes, Victoria Nyanza, Wheat.

NITROGEN—
Properties. See article Nitrogen.
Presence: Acid, Air, Albumin, Alfalfa, Ammonia, Bean, Beef, Blood, Cereal, Cheese, Clover, Cotton (seed), Egg, Gas, Guano, Milk, Manure, Pea, Phosphate, Proteins, Saltpeter, Slag.
Use: Anaesthetic, Aniline, Dynamite, Etching, Fertilizer, Gunpowder, Nitroglycerine, Torpedo.
See article Bacterium.

NORTH CAROLINA—
For Products, Animals, and Plants, see Southern States under United States: Products, etc.
For Minerals, see Eastern States under United States: Mineral Products.
Additional References: Albemarle, Cape Hatteras, Cypress, Raccoon, Oyster, Tar, Turpentine, Tobacco, Walnut, Tennessee, Raleigh, Locke, Cornwallis, Mecklenburg Declaration, Secession.

NORTH DAKOTA—
For Products, Animals, and Plants, see Northern States under United States: Products, etc.
For Minerals, see Northern States under United States: Mineral Products.
Additional References: Clay, Missouri, Hay, Cement, Hudson Bay Company, Lewis and Clark Expedition, Wheat, Coal, Fargo.

NORWAY—
Position, Surface, and Area. See article on Norway.
Productions, Occupations, and Manufactures. See statistics under Norway.
Cities: Christiania, Bergen, Hammerfest, Trondhjem.
Noted Persons: Margaret, Harold, Bull, Boyesen, Ibsen, Lie, Björnsen, Nansen, Grieg, Haakon, Wergeland, Snorre Sturleson, Eric the Red, Ericson Leif, Hedin, Nordenskjold, Knute.
Other References: Maelstrom, Lofoden Islands, Cod, Normans, Mythology (Norse), Norwegian Literature under Literature, Skald, Alfadur, Arne, Congress of Vienna, Norsemen, Aegir, Aesir, Glacier, Lumbering, Fishery, Sweden.

NURSERY RHYMES AND STORIES—
Babes in the Wood, Banbury, Beauty and the Beast, Bluebeard, Cinderella, Goody Two-Shoes, Griselda, Hop o' My Thumb, Jack and Jill, Jack Frost, Jack Horner, Jack the Giant Killer, Jack-in-the-Pulpit, Little Red Riding Hood, Nicholas (Saint), Puss-in-Boots, Robin Hood, Tom Thumb, Whittington.
See also Horn Book, Fairy Tales, Werewolf, Aesop, Lokman, La Fontaine, Lang A., Dodgson, Arabian Nights' Entertainments, Gulliver's Travels, Mother Goose, Alcott L. M.

NUTS—
See Nut, Trees, Nut Bearing.

OHIO—
For Products, Animals, and Plants, see Middle States under United States: Products, etc.
For Minerals, see Northern States under United States: Mineral Products.
Additional References: Erie, Coal, Petroleum, Buckeye, Vehicles, Furniture, Car, Clothing, Boots and Shoes, Cleveland, Columbus, Cincinnati, Toledo, Akron, Harrison, Western Reserve, Harmon, Tecumseh, Oberlin, Perry, Blennerhasset, Wayne, Northwest Territory, Clark, Standard Oil Co., Mound Builders, Salt, Tobacco, Cheese, Hog.

OKLAHOMA—
For Products, Animals, and Plants, see Southern States under United States: Products, etc.
For Minerals, see Southern States under United States: Mineral Products.
Additional References: Cotton, Prohibition, Petroleum, Indian Territory.

ORDERS AND SOCIETIES—
American Ornithologist's Union.
American Party.
Ancient Order of United Workmen.
Blue Stocking Club.
Boy Scouts.
Boxers.
Brook Farm.
Building and Loan Association.
Camorra.
Capuchin.
Confederate Veterans.
Daughters of American Revolution.
Eastern Star.
Elks.
Epworth League.
Farmers' Alliance.
Fraternal Organizations.
Garter.
Good Templars.
Grand Army of the Republic.
Guild.
Grangers.
Jesuits.
Knights of Labor.
Knights of Pythias.
Ku-Klux-Klan.
Mafia.
Masons.
Modern Woodmen of America.
Molly Maguires.
National Education Association.
Nihilists.
Odd Fellows.
Orangemen.
Phi Beta Kappa.
Royal Society.
Tammany.
Templars.
Thugs.
Trappists.
Whitecaps.
Woman's Relief Corps.
Young Men's Christian Association.
Young Women's Christian Association.

OREGON—
For Products, Animals, and Plants, see Northern States under United States: Products, etc.
For Minerals, see Western States under United States: Mineral Products.
Additional References: Snake, Columbia, Pine, Gold, Granite, Salmon, Trout, Astor, Portland, Fur, Whitman, Peach, Fish, Ship, Lewis and Clark Expedition, Fir, Shoshoni, Hop, Apple.

OXYGEN—
Properties: Alchemy, Lavoisier, Priestly, See also article Oxygen.
Presence: Acid, Air, Animal, Gas, Minerals, Ozone, Plants, Rust, Soil, Starch, Sugar, Water.
Use: Bleaching, Drowning, Fire, Food, Heat, Gutta Percha, Lungs, Sanitary Science, Heating and Ventilating, Damps, Blowpipe, Bunsen, Iron.

PAINT—
Bristle, Chromium, Clay, Fresco, Gamboge, Linseed, Ochre, Paris Green, Umber, White Lead, Vermilion, Whitewash, Zinc, Varnish, Lac, Oil, Color.

PAINTING, A FINE ART—
See Artists under Famous Men under the various countries.
Noted Galleries and Cities Having Collections: Amsterdam, Antwerp, Augsburg, Berlin, Bruges, Brussels, Budapest, Dresden, Florence, Farnese Palace, Hague, London, Louvre, Madrid, Munich, Naples, Nuremberg, Paris, Rome, Rotterdam, St. Petersburg, Siena, Stuttgart, Venice, Vienna.
See also Fresco, Gamboge, Gilding, Glass, Madonna, Mosaic, Salon, Sepia, Art, Cartoon, Alabaster, Halo, Perspective, Painting in Mosaic.

PALESTINE—
Bethlehem, Calvary, Carmel, Cedar, Crusades, Dead Sea, Galilee, Gethsemane, Jerusalem, Jesus Christ, Jews, Jordan, Lebanon, Moses, Sinai, Philistines, Samaritans, Shiloh, Sodom, Syria, Templars, Turkey.

PARAGUAY—
Argentine, La Plata, Yerba Mate, Quebracho, Alligator, Orange, Latin America.

PARIS AND VICINITY—
Bastille, Catacombs, Champs Elysee, Cuvier, Eiffel Tower, Ecole des Beaux Arts, Exposition, French Revolution, Fontainebleau, Guillotine, Louvre, Luxembourg Palace, Morgue, Napoleon, Notre Dame, Octroi, Pere Lachaise, St. Cloud, St. Denis, St. Germain, Salon, Sarbonne, Seine.

PARKS—
Bartram, Berlin, Canadian National Park, Central Park, Downing A., Hampton Court, Hyde Park, Kew Gardens, Landscape Gardening, Olmsted F., Shaw's Garden, Versailles, Yellowstone Park, Yosemite, Playgrounds.
See also Paris, London, Chicago, and other large cities.

PENNSYLVANIA—
For Products, Animals, and Plants, see Northern States under United States: Products, etc.
For Minerals, see Eastern States under United States: Mineral Products.
Additional References: Coal, Petroleum, Gas, Sandstone, Limestone, Ships, Penn, Quakers, Franklin, Philadelphia, Bouquet, Rittenhouse, Continental Congress, Franklin, Floriculture, Appalachians.

PERSIA—
Area, Position, and Boundaries. See article Persia.
Waters: Persian Gulf and Gulf of Omar, Caspian Sea, Euphrates, Tigris.
Minerals: Tin, Iron, Antimony, Nickel, Cobalt, Coal, Zinc, Manganese, Borax, Ochre, Salt, Sulphur, Alum, Turquoise.

Plants and Animals: Cereals, Poppy, Rose, Tuberose, Tulip, Tea, Sugar-cane, Lion, Leopard, Ass, Wolf, Sheep, Goat, Deer, Camel, Peach, Horse.
Products and Industries: Wheat, Barley, Rice, Sugar, Gum, Silk, Opium, Tobacco, Attar of Roses, Asafoetida, Rug, Tapestry, Cotton, Wool, Tea, Pearl.
Cities: Persepolis, Susa, Teheran.
History: Aryan Race, Cyrus, Shah Nameh, Cambyses, Darius, Tamerlane, Harun-al-Rashid, Xerxes, Zoroaster, Rustum, Parsees, Medes, Mohammedanism.
See also Afghanistan, Irrigation, Caravan, Ararat, Turkestan, Sand, Bagdad.

PERU—
Area and Position. See article Peru.
Surface and Waters: Andes, Amazon, Titicaca.
Minerals: Silver, Copper, Mercury, Zinc, Lead, Borax, Sulphur, Antimony, Petroleum.
Animals: Alpaca, Llama, Vicuña, Chinchilla, Condor, Tern, Gull, Cormorant. See also Guano.
Plants: Cinchona, Grape, Palm, Orange, Maize, Ebony, Mahogany, Rubber Tree.
Products: Wool, Rubber, Ramie, Dye, Sugar, Coffee, Quinine.
History: Incas, Pizarro, Lima, Prescott, Callao.

PETROLEUM—
Nature and Origin. See article Petroleum.
Occurrence: Pennsylvania, New York, Ohio, West Virginia, Indiana, Oklahoma, Colorado, California, Baku, Japan, India, Sumatra, Java, Borneo, Texas, Illinois, Kansas, Russia, Rumania.
Supply: Standard Oil Company, Rockefeller, Boring, Pipe Line.
Products and Uses: Gasoline, Kerosene, Naphtha, Asphalt, Vaseline, Oil (lubricating), Paraffin, Lighting, Heating, Locomotive.

PHILADELPHIA—
Bartram, Building and Loan Association, Constitution, Centennial Exhibition, Delaware, Franklin, Girard, Independence Hall, Insurance, Liberty Bell, Manila, Municipal Ownership, Penn, Pennsylvania, Rittenhouse, Sunday School, Wanamaker.

PHILANTHROPY—
Charterhouse, Hirsch, MacDonald, Burdette, Rockefeller, Carnegie, Carnegie Foundation, Carnegie Institution, Peabody, Tuskeegee Institute, Poor Laws.

PHILOSOPHY—
Democritus, Descartes, Theism, Theosophy, Bruno F., Le Conte, Thinking, Christian Science, Schelling, Hegel, Alcott A. B.

PHYSICS—
Mechanics: Dynamics, Energy, Erg, Lever, Friction, Force, Harmonic Motion, Horsepower, Hydrometer, Hydraulic Press, Hydraulic Ram, Inclined Plane, Machine, Dynamics, Dynamo, Waterpower, Dynamometer, Dyne, Pulley.
Properties of Matter: Hardness, Diffusion, Ductility, Cohesion, Capillarity, Elasticity, Inertia.
Gravity: Weight, Falling Bodies, Screw, Wedge, Center of Gravity, Centrifugal Force, Gyroscope.
Light: Sun, Ether, Lens, Rainbow, Mirage, Telescope, Microscope, Eye, Spectacles, Color, Purple, Mirror, Magic Lantern, X-Rays, Aberration, Blue Print, Camera, Color, Color Blindness, Interference, Photometry, Polarization, Radiation, Shadow, Twilight, Fluorescence, Diffraction, Dispersion, Gas, Star, Chemistry.
Heat: Expansion, Specific Heat, Thermometer, Melting, Distillation, Combustion, Boiling, Caloric, Charles' Law, Gas Engines, Governor, Humidity, Hygrometer, Radiometer, Zero, Evaporation, Radiation.
Sound: Ear, Pitch, Music, Harmonics, Phonograph, Voice, Resonance, Sonometer, Piano, Violin.
Electricity: Aurora Borealis, Leyden Jar, Telegraphy, Telephone, Electric Lighting, Magnetism, Electro-Magnet, Armature, Battery, Dynamo, Cathode Rays, Electrotype, Electromotive Force, Electrolysis, Induction, Motor, Potential, Wireless Telegraphy.
Unclassified: Air, Air-pump, Balloon, Barometer, Magdeburg Hemispheres, Siphon, Compressed Air.
Allied Topics: Alchemy, Chemistry, Agriculture, Physiology, Twilight, Standards, Crystallography, Halo, Perpetual Motion.

PHOSPHORUS—
Properties: See articles Phosphorus, Chemistry.
Presence: Bone, Egg, Fish, Manure, Phosphate, Guano.
Use: Brain, Fertilizer, Food, Poison, Matches.

PHOTOGRAPHY—
Blue Print, Camera, Moving Pictures, Color Photography, Half Tone, Electrotype, Daguerreotype, Scheele, Kodak.

PHYSIOLOGY—
Skeleton: Anatomy, Bone, Skull, Larynx, Adam's Apple, Atlas. See Skeleton for classification of bones.
Muscles: Achilles' Tendon, Diaphragm, Sinew, Tongue.
Skin: Albinos, Barber, Dentistry, Hair, Teeth, Wart, Capillaries.
Circulation: Aorta, Blood, Circulation, Artery, Metabolism, Respiration, Capillaries, Spleen.
Lungs: Air, Carbon, Drowning, Heating and Ventilating, Lungs.
Eye: Color, Blindness, Lens, Light, Astigmatism, Shortsight, Spectacles, Color Blindness.

Nerves: Brain, Spinal Cord, Senses, Pain, Vertigo, Insanity, Chloral, Bromine, Stammering, Sleep, Dream.
Ear: Music, Sound, Voice.
Secretions: Bile, Gastric Juice, Liver, Perspiration, Saliva, Spleen.
Diseases: Adenoids, Adolescence, Ague, Ambulance, Anaemia, Anthrax, Antiseptic, Apoplexy, Appendicitis, Asthma, Astigmatism, Bacterium, Baldness, Barber's Itch, Black Death, Board of Health, Bright's Disease, Bronchitis, Bubonic Plague, Cancer, Cataract, Catarrh, Chicken Pox, Cholera, Colic, Consumption, Delirium Tremens, Diphtheria, Dropsy, Dyspepsia, Epilepsy, Erysipelas, Fever, Fly, Gangrene, Goiter, Gout, Hallucination, Hay Fever, Headache, Hiccup, Hives, Hookworm, Hysteria, Infantile Paralysis, Influenza, Insomnia, Intoxication, Jaundice, Leprosy, Lockjaw, Lumbago, Malaria, Measles, Medicine, Mosquito, Mumps, Neuralgia, Neurasthenia, Pellagra, Pepsin, Pleurisy, Pneumonia, Quinsy, Rabies, Rheumatism, Rickets, St. Vitus Dance, Scarlet Fever, Scrofula, Scurvy, Seasickness, Serum Therapy, Smallpox, Sunstroke, Tapeworm, Tuberculosis, Tumor, Typhoid Fever, Vaccination, Whooping Cough, Wool Sorter's Disease, Yellow Fever.
Hygiene: Acclimatization, Bath, Bacterium, Disinfectant, Fly, Garbage, Hygieia, Heating and Ventilation, Massage, Mosquito, Quarantine, Rat, Sanitary Science, Serum, Sewage, Vaccination.
Diet: Adulteration, Assimilation, Alimentary Canal, Anaesthesia, Caffeine, Cocoa, Canning, Coffee, Cold Storage, Heredity, Albumen, Famine, Food, Macaroni, Narcotic, Proteins, Salt, Starvation, Tapioca, Tea, Vegetarian.
Personal: Age, Corpulence, Dwarf, Giant, Height, Philosopher's Stone, Weight of Human Body.

PLANTS—
Air Plants: Air Plants, Orchids, Lichens.
Cereals: Barley, Buckwheat, Corn, Kafir Corn, Oats, Popcorn, Rye, Wheat.
Grasses, Sedges, Etc.: Bamboo, Beach Grass, Blue Grass, Cat-tail, Esparto, Fescue, Grass, Papyrus, Sorghum, Timothy, Fox Tail, Quack Grass, Rush, Buffalo Grass. See also Canebrake.
Forage Plants: Alfalfa, Alsike, Bean, Clover, Millet, Pea, Shamrock, Vetch.
Flowers: Acanthus, Amaranth, Anemone, Arbutus, Arethusa, Asphodel, Aster, Bellflower, Bladderwort, Bloodroot, Bryonia, Buttercup, Calceolaria, Compass Plant, Nasturtium, Begonia, Camass, Violet, Carnation, Chrysanthemum, Clematis, Calla, Columbine, Cowslip, Crocus, Cyclamen, Daffodil, Dahlia, Daisy, Dandelion, Dogbane, Dutchman's Breeches, Edelweis, Forget-me-not, Four-o'clock, Foxglove, Fuchsia, Gentian, Geranium, Gilia, Gladiolus, Goldenrod, Heliotrope, Hepatica, Hollyhock, Honeysuckle, Hyacinth, Indian-Pipe, Jack-in-the-Pulpit, Jacob's Ladder, Lady's Slipper, Larkspur, Lily, Lotus, Lupine, Marigold, Mariposa Lily, Marshmallow, Mignonette, Morning Glory, Nelumbo, Orchids, Pansy, Passion Flower, Peony, Petunia, Phlox, Pimpernel, Pitcher Plant, Portulaca, Primrose, Rose, Rosemary, Skunk Cabbage, Snapdragon, Snowdrop, Solomon's Seal, Sunflower, Sweet Pea, Sweet William, Touch-me-not, Trumpet Creeper, Tuberose, Tulip, Venus' Fly-Trap, Verbena, Wake-Robin, Water Hyacinth, Water Lily. See also Floriculture, Greenhouse.
Orchard Fruits: Apple, Apricot, Cherry, Concord Grape, Crabapple, Damson, Grape, Medlar, Papaw, Peach, Pear, Persimmon, Plum, Prune, Quince, Sloe, Kumquat, Catawba.
Small Fruits: Blackberry, Blueberry, Cranberry, Dewberry, Gooseberry, Huckleberry, Strawberry, Raspberry.
Garden Vegetables: Artichoke, Asparagus, Bean, Beet, Cabbage, Cantaloupe, Carrot, Cauliflower, Celery, Citron, Cucumber, Egg Plant, Garlic, Gourd, Ground-Cherry, Horse-radish, Leek, Lentil, Lettuce, Muskmelon, Onion, Parsley, Parsnip, Pea, Peanut, Pepper, Potato, Pumpkin, Radish, Rhubarb, Salsify, Squash, Sweet Potato, Tomato, Tuber, Turnip, Watermelon, Yam.
Tropical and Subtropical Fruits: Banana, Date (Palm), Fig, Grape-fruit, Guava, Lemon, Lime, Mango, Olive, Orange, Pineapple, Pomegranate, Shaddock, Tamarind, Bergamot.
Nutbearing Plants: Almond, Beech, Betel, Brazil Nut, Butternut, Chestnut, Chinquapin, Cocoanut, Cashew, Hazel, Hickory, Nutmeg, Pecan, Walnut, Pistachio.
Perfume-Yielding Plants: Acacia, Carnation, Heliotrope, Jasmine, Lavender, Mignonette, Myrrh, Rose, Tuberose, Violet.
Spices and Flavors: Allspice, Almond, Anise, Caper, Caraway, Cayenne Pepper, Cinnamon, Clove, Coriander, Cassia, Dill, Ginger, Mallow, Mustard, Nutmeg, Pepper, Peppermint, Pimento, Sage, Sassafras, Sweet Flag, Thyme, Vanila, Wintergreen.
Gums: Acacia, Copal, Chicle, Guayule, Lac, Manna, Rubber, Spruce, Tragacanth.
Desert Plants: Agave, Cactus, Sagebrush, Yucca.
Dye Plants: Indigo, Logwood, Madder, Puccoon, Saffron, Wood.
Medicinal Plants: Aconite, Aloe, Arnica, Balsam, Boneset, Catnip, Castor Bean, Cinchona, Colocynth, Cubeb, Dandelion, Eucalyptus, Ginseng, Hop, Hyssop, Ipecac, Jalap, Licorice, Lobelia, Mandrake, Pennyroyal, Quassia, Rue, Sarsaparilla,

Senna, Snakeroot, Spikenard, Squill, Stramonium, Tansy, Yarrow. See also Drugs.

Fiber Plants: Agave, Cotton, Esparto, Flax, Hemp, Manila, Nettle, Pineapple Fiber, Raffia, Ramie, Rattan, Sisal, Yucca.

Shrubbery and Shrubs: Alder, Arbor Vitae, Bearberry, Bladdernut, Bittersweet, Box, Dogwood, Elder, Hydrangea, Ivy, Gorse, Guelder-rose, Hawthorn, Heath, Holly, Jessamine, Juniper, Laburnum, Laurel, Leatherwood, Lilac, Mesquite, Mountain Ash, Myrtle, Ninebark, Oleander, Osage Orange, Osier, Prickly Ash, Privet, Rhododendron, Sagebrush, Spiraea, Sumac, Trumpet Creeper, Viburnum, Virginia Creeper, Virgin's Bower, Witch Hazel.

Weeds: Burdock, Camass, Canada Thistle, Dodder, Fennel, Ground Ivy, Locoweed, Milkweed, Mullein, Nightshade, Pigweed, Poison Ivy, Ragweed, Russian Thistle, Sensitive Plant, Shepherd's Purse, Stickseed, Teasel, Tumbleweed, Cockle, Cockleburr, Water Hyacinth.

Trees: Ash, Banyan, Baobab, Basswood, Birch, Buckeye, Box-elder, Catalpa, Cashew, Cedar, Cypress, Ebony, Elm, Eucalyptus, Fir, Hackberry, Hemlock, Hickory, Honey Locust, Larch, Lignum Vitae, Locust, Magnolia, Mahogany, Mangrove, Maple, Mate or Paraguay Tea, Mulberry, Oak, Palm, Palmetto, Papaw, Peepul, Pine, Poplar, Pruning, Quebracho, Sandalwood, Screw Pine, Sequoia, Shittimwood, Spruce, Sycamore, Tallow Tree, Upas, Willow, Yew. See Orchard Fruits, Grafting, Spraying.

Plants producing spores instead of seeds: Algae, Bacteria, Ferns, Fungi, Ground Pine, Irish Moss, Kelp, Lichen, Liverwort, Molds, Mosses, Mushroom, Puff Ball, Seaweed, Sphagnum, Truffle, Wilt, Yeast. See Spores.

Plant Products: Amber, Cocoa, Coffee, Cork, Ergot, Galls, Gluten, Gum, Gutta Percha, Lac, Opium, Peat, Pitch, Rubber, Sago, Sap, Tea, Gumbo, Chicory, Fiber, Food.

Parasites: Dodder, Indian Pipe, Mistletoe, Spanish Moss.

Plant Enemies: Aphids, Army Worm, Beetle, Blight, Cockchafer, Codlin Moth, Cotton Boll-Weevil, Curculio, Cutworm, Grasshopper, Moth, Scale Insect, Squash Bug, Weevil.

General Terms: Age, Air-plants, Alps, Botanical Garden, Botany, Bulb, Conifers, Cross-Fertilization, Dry Rot, Floriculture, Flowers, Forestry, Germ, Germination, Greenhouse, Heat, Herb, Acclimatization, Ecology, Epiphytes, Rot, Taxonomy, Transpiration, Canning, Cell, Alpine Plants, Herbarium, Kew, Mendel's Law, Mutation, Orchard, Pollard, Sargasso, Sedge, Seed, Starch, Tree.

Botanists: Banks, Bartram, Bessey, Burbank, Darlington, De Candolle, Eschscholtz, Gray A., Hooker, Jussieu, La Marck, Linnaeus, Ray.

POISON—

Acid, Aconite, Antimony, Arnica, Arsenic, Carbolic Acid, Gamboge, Henbane, Iodine, Mercury, Nightshade, Nux Vomica, Opium, Paris Green, Phosphorus, Ptomaine, Strychnine, Verdegris, Vitriol.

POLAND—

See Russia.

PORTUGAL—

Azores, Camoens, Cork, Dias, Earthquake, Gama (Vasco da), Lisbon, Madeira, Magellan, Olive, Oporto, Sherry, Wine, Cabral.

POSTOFFICE—

Express, Franking, Hill R., Pneumatic Tubes, Postal Information, Postal Savings Banks, Telegraph, Telephone, Railroad.

PRINTING—

Inventors: Cadmus, Gutenberg, Hoe, Mergenthaler, Caxton.

Materials: Ink, Letters (frequency of), Linotype, Lithography, Paper, Papyrus, Parchment, Rice Paper, Papier-Mache, Proofreading, Stereotype, Cuneiform Writing, Stencil, Type, Typewriter, Rune, Electrotype, Halftone, Photogravure.

Products: Advertising, Books, Monogram, Newspapers, Periodicals.

Printers: Aldine, Elzevir, Franklin, Tauchnitz K.

Related Topics: Alphabet, Bookbinding, Censor, Abbreviations, Advertisement.

PSYCHOLOGY—

Habit, Apperception, Consciousness, Feeling, Hallucination, Heredity, Interest, Ladd, Phrenology, Memory, Will, Instinct, Imagination, Imitation, Thinking, Dream.

RACE—

Ainos, Aryan, Bantu, Basque, Berbers, Bushmen, Calmucks, Caucasian, Celts, Copts, Creole, Czechs, Eurasian, Germans, Gipsies, Goths, Ham, Hottentot, Huns, Iberians, Jutes, Kafirs, Lombards, Malays, Mongolia, Moors, Mulatto, Negro, Picts, Semites, Slavs, Tartars, Walloons, Wends, Zulus, Cannibal.

See also articles on different countries, as Russia, Japan, Abyssinia, Turkey, for racial affinities of the inhabitants.

RAILWAY—

Air-Brake, Block System, Bridge, Caboose, Car, Cincinnati Southern Railroad, Credit Mobilier, Demurrage, Depot, Harriman, Hoosac Tunnel, Locomotive, Pullman, Railroad, St. Louis, Semaphore, Snowplow, Street Railway, Switzerland, Trans-Siberian Railway, Tunnel.

REAL ESTATE—

Abstract of Title, Freeholder, Gavelkind, Homestead, Inclosure, Inheritance, Land Tenure, Mortgage, Public Lands.

REFORMATION, PROTESTANT—
Albigenses, Calvin, Erasmus, Huguenots, Huss, Jerome of Prague, Knox, Lollards, Luther, Melanchthon, Servetus, Waldensians, Wyclif, Zwingli, Savonarola.

RELIGION—
Primitive: Idolatry, Nature Worship, Fire Worshipers.
Druids: Beltane, Stonehenge, Dolmen, Carnac.
Worship of Ancestors and Confucianism: Lamaism, Ancestor Worship, Taoism, Shintoism, Buddha, Brahma, Confucius, Nirvana, Zoroaster, Parsees, Magi, Juggernaut, Transmigration.
Jewish: Pharisees, Sadducees, Solomon's Temple, Ark, Tabernacle, Jerusalem, Passover, Scapegoat, Jubilee.
Mohammedanism: Mohammed, Koran, Mosque, Dervishes, Mahdi, Caliph.
Catholicism: Catholic Church, Fathers, Scholasticism, Canossa, Conclave, Council of Nice, Tonsure, Cardinal, Bishop, Archbishop, Friar, Breviary, Sacrament, Ash Wednesday, Benefit of Clergy, Bull, Capuchin, Concordat, Celibacy, Damien, Lateran, Lingard, Monasticism, Papacy, Papal States, Peter's Pence, St. Peter's, Sieyes, Vatican, Vulgate, Trappists.
Catholic Orders and Societies: Anchorites, Blackfriars, Capuchin, Dominicans, Franciscans, Jesuits, Monasticism, Bec, Sisters of Charity.
Eminent Churchmen: Arminius, Alcuin, Augustine, Anselm, Becket, Bede, Athanasius, Benedict St., Clement, Cranmer, Christopher, Erasmus, Fulda, Francis of Assisi, Gregory, Hilda, Innocent, Kempis, Peter the Hermit, Langton, Land, Loyola, Leo, Ansgar, Chrysostom, Aquinas, Denis, Dunstan, Jerome, Origen, Sixtus, St. Patrick, Ulfilas, Scotus, Savonarola, Tertullian, Torquemada, Simeon Stylites, Xavier.
Adventists: Sabbath.
Anabaptists: Münster.
Baptists: Williams R., Spurgeon.
Christian Science: Eddy, Science and Health.
Congregationalists: Beecher, Pilgrims, Plymouth.
Copts: Egypt, Abyssinia.
Dutch Reformed Church: Jansen.
Episcopal Church: Apostles' Creed, Apostolic Succession, Articles, Litany, Liturgy, Lent, Shrove, Ash Wednesday, Vicar, Disestablishment, Paley, Trinity, Latimer.
Friends: Penn.
Greek Church: Iconoclasts, Russia, Constantinople, Czar, Moscow.
Lutherans: Luther, Wittenberg, Zwingli, Melancthon.
Methodists: Methodism, Epworth League, Whitefield, Wesley, Cartwright.
Mennonites: Manitoba, Russia.
Missions: Ansgar, Grenfell, Xavier.
Mormons: Temple, Young B.
Presbyterians: Free Church, Westminster Assembly, Westminster Catechism, Knox, Chalmers, Calvin, Albigenses, Covenanters, Huguenots, Glebe, Manse, Puritan, Test Act.
Unitarians: Transcendentalism, Strauss, Arianism.
Additional References: Agnes Dei, Carnival, Catechism, Christian Endeavor, Christmas, Cross, Cross Buns, Crusades, Dies Irae, Frankincense, Grail, Hymn, Inquisition, Lollards, Oberammergau, Passion Play, Renan, Sheol, Sunday School, Thanksgiving Day, Waldensians, Young Men's Christian Association, Deaconess, Festivals, Fetish, Heaven, Hell, Jesus Christ, Shinto, Sikhs, Young Women's Christian Association, Censer, Anchorites, Cathedral, Christianity, Church, Easter, Good Friday, Lent, Baptism, Booth, Dowie, Fasting, Besant, Blavatsky, Baptist, Young People's Union, Andrew, Shakers, Theism, Theosophy, Spiritualism, Shamanism, Assassins, Abecedarians, Agnostics, Atheism, Quakers, Dunkards, Universalists. See also references under Bible and Clergymen under the various countries.

RHETORIC—
Abbreviations, Allegory, Analogy, Aristotle, Alliteration, Anagram, Athenaeum, Caricature, Conundrum, Dilemma, Drama, Epigram, Essay, Figures of Speech, Grammar, Hyperbole, Literature, Metaphor, Poetry, Palindrome, Punctuation, Simile, Sonnet, Sophists, Spelling, Syllogism, Writing.

RHINE RIVER—
Alps, Constance, Mainz, Coblenz, Cologne, Heidelberg, Bonn, Bingen, Moselle, Ehrenbreitstein, Mouse Tower, Lorelei, Drachenfels, Ferry, Strasburg, Alsace-Lorraine.

RHODE ISLAND—
For Products, Animals, and Plants, see Northern States under United States: Products, etc.
For Minerals, see Eastern States under United States: Mineral Products.
Additional References: Williams, Providence, Hutchinson, Baptists, Cotton, Boots and Shoes, Dorr, Brown University.

RIVERS—
North American: Colorado, Columbia, Hudson, Mackenzie, Missouri, Niagara, Potomac, Red, Rio Grande, St. Lawrence, Saskatchewan, Snake, Yukon. See also Lewis and Clark, Salton Sea, Delta.
South American: Amazon, La Plata, Orinoco.
European: Arno, Clyde, Danube, Elbe, Loire, Po, Rhine, Rubicon, Seine, Shannon, Tay, Thames, Tiber, Volga. See also Dardenelles.

Asiatic: Amur, Euphrates, Ganges, Hoang-Ho, Indus, Irawadi, Jordan, Obi, Yang-tse-Kiang, Tigris, Yenesei.
African: Congo, Nile, Niger, Zambesi.
General Terms: Cascades, Dalles, Delta, Waterfall, Waterpower, Grand Cañon.

ROME AND THE ROMAN EMPIRE—

Mythology: Aesculapius, Aurora, Avernus, Camilla, Cacus, Cupid, Diana, Dis, Fama, Genius, Janus, Jupiter, Lares, Manes, Mars, Minerva, Neptune, Orcus, Penates, Phoenix, Pomona, Rhea, Saturn, Vulcan.
Tales: Cincinnatus, Decemvirs, Dido, Romulus, Sabines, Sibyls, Tarpeia, Aeneid, Gladiators.
Ancient Rome: Amphora, Appian Way, Aqueduct, Calends, Campus Martius, Capua, Carthage, Catacombs, Circus, Cloaca Maxima, Coliseum, Eturia, Forum, Gabinian Law, Gladiator, Goths, Hannibal, Proconsul, Rollin, Tiber, Triumvirate, Patricians, Galley, Plebeians, Campania.
Wars and Battles: Actium, Alaric, Belisarius, Carthage, Cleopatra, Hannibal, Mithridatic War, Odoacer, Punic Wars, Pyrrhus, Scipio, Stilicho, Sulla, Zenobia.
Noted Romans: Agricola, Agrippa, Antony, Augustus, Brutus, Caesar, Catiline, Caligula, Cornelia, Corinna, Cecilia St., Cato, Constantine, Curtius, Fabius, Gracchi, Hadrian, Justinian, Maecenas, Marcus Aurelius, Nero, Pompey, Severus, Scipio, Spartacus, Suetonius, Sulla, Tarpeia, Triumvirate.
Latin Writers: Agricola, Caesar, Catullus, Cicero, Epictetus, Horace, Juvenal, Livy, Lucretius, Nepos C., Ovid, Plautus, Pliny, Sallust, Seneca, Tacitus, Terence, Virgil, Androcles.
Modern Rome: Lateran, Mommsen, Rienzi, St. Peter's, Vatican, Garibaldi, Victor Emmanuel.

RUSSIA—

Area and Position. See article Russia.
Surface and Waters: Ural Mountains, Ararat, Volga, Black Sea, Azov, Caspian Sea, Ladoga, Siberia, Yenisei, Lena.
Minerals: Salt, Iron, Coal, Petroleum, Silver, Lead, Zinc, Platinum, Gold, Mercury, Sulphur, Cobalt.
Animals: Reindeer, Aurochs, Wolf, Sable, Bear, Marten, Weasel, Muskrat, Lemming, Eagle, Grouse, Pelican, Snipe, Quail, Partridge, Rook, Seal, Sturgeon, Salmon.
Plants: Moss, Willow, Alder, Fir, Poplar, Birch, Pine, Oak.
Crops: Wheat, Rye, Oats, Barley, Indian Corn, Buckwheat, Hemp, Flax, Beet, Sunflower, Cotton, Grape.
Products: Flour, Lumber, Steel, Wine, Wool, Leather, Silk, Linen, Paper, Glass, Pottery, Rope, Soap, Candle, Tobacco, Oil, Sable, Seal.
Provinces and Race Elements: Caucasian Race, Poland, Cossacks, Tartars, Slav, Ainos, Armenia, Berlin Treaty, Finland, Lapland, Turkey, Turkestan, Turanian, Siberia, Crimea, Bokhara. See Siberia.
Cities: Archangel, Astrakhan, Baku, Balaklava, Kiev, Moscow, Nijni Novgorod, Odessa, Riga, St. Petersburg, Sebastopol, Vladivostok, Warsaw.
Noted Persons: Demidoff, Gorky, Mazeppa, Tolstoi, Vereschagin, Turgenieff, Blavatsky, Pulaski, Modjeska, Chopin, Tschaikowsky, Sienkiewicz, Rubenstein, Catherine II, Elizabeth II, Nicholas, Romanoff, Zemstrov, Kosciusko.
Government and Rulers: Alexander, Catharine, Czar, Elizabeth, Greek Church, Ivan, Kremlin, Mir, Nicholas, Nihilists, Peter I, Serf, Duma, Congress of Vienna.
Statistics. See article Russia.
History: Russo-Japanese War, Russo-Turkish War, Hague Tribunal.

SCOTLAND—

Mountains: Highlands.
Waters: Clyde, Katrine, Lomond, Solway, Firth, Tay, Yarrow.
Islands: Hebrides, Orkney, Shetland.
Literature: Amy Robsart, Aytoun, Barrie, Black, Burns, Crockett, Galt, Hogg, Hume, Jeffrey, Lady of the Lake, Lindsay, Livingstone, Lyell Sir C., Macdonald G., Alloway, Kirk, Lang, Ferguson, Beattie, Baillie, Lockhart, Macpherson J., Miller H., Napier J., Chambers, Constable Stevenson, Ramsay, Robertson, Scott Sir W., Smith A., Stephenson R. L., Watts I., Wilson J.
History: Agricola, Alexander, Argyll, Baliol, Bannockburn, Bothwell, Bruce, Culloden, Douglas, Dumbarton, Falkirk, Flodden Field, Glencoe, James, MacDonald F., Margaret, Mary Stuart, Wallace, James I to V, Alexander III.
Science, Etc.: Macadam, Law, Lyell, Napier, Miller, Drummond, Robertson, Macpherson, Ramsay, Blackwood, Maxwell.
Places of Note: Abbotsford, Aberdeen, Arthur's Seat, Ayr, Balmoral, Carlisle, Dumfries, Edinburgh, Ettrick, Glasgow, Gretna Green, Linlithgow, Stirling, Stornoway, Paisley, Loch Katrine.
Antiquities and Sports: Andrew St., Beltane, Blue Gowns, Ben, Bagpipe, Bonnet, Broch, Caledonia, Clan, Glenlivet, Golf, Hallowe'en, Macbeth, Picts, Plaid, Scone, Tartan, Blackmail.
Religion: Cameron, Covenanters, Free Church, Knox, MacLeod N., Presbyterians, Chalmers.

SCOTT, SIR WALTER—

Localities: Abbotsford, Edinburgh, Melrose, Scott Monument.
Works: Antiquary, Betrothed, Bride of Lammermoor, Fair Maid of Perth, Guy Mannering, Heart of Midlothian, Ivanhoe, Kenilworth, Lady of the Lake, Lay of the Last Minstrel, Marmion, Old Mortality, Talisman, The Monastery. See also Constable, Lockhart.

Characters: Black Douglas, Bois-Guilbert, Ivanhoe, Lochinvar, Meg Merrilies, Rebecca, Rob Roy.
Quotations: Coronach, Fates, Harp, Holly, Percy, Roland.

SCULPTURE—
Definition. See article Sculpture.
Materials: Marble, Plaster of Paris, Bronze, Silver, Casting, Carrara, Carving, Cast.
Noted Sculptors: Apelles, Bartholdi, Canova, Flaxman, French D., MacMonnies, Michelangelo, Phidias, Powers, Praxiteles, Rogers, Saint-Gaudens, Thorwaldsen.
Famous Sculptures: Aeginetan Marbles, Apollo, Merlin, Berne, Bingen, Caryatid, Colossus, Edfu, Elgin Marbles, Ellora, Farnese Bull, Florence, Hall of Fame, Liberty (Statue of), Louvre, Mukden, Munich, Nineveh, Palladium, Parthenon, Vatican, Venus de Milo, Zeus, Arundel Marbles.

SHAKESPEARE, WILLIAM—
Persons and Places: Avon, Arden, Capulet, Elizabeth, Globe Theatre, Stratford, Lucy Sir Thomas.
Plays: All's Well That Ends Well, Anthony and Cleopatra, As You Like It, Comedy of Errors, Hamlet, King Lear, Macbeth, Merchant of Venice, Midsummer Night's Dream, Much Ado About Nothing, Othello, Romeo and Juliet, Tempest.
Characters: Ariel, Bassanio, Benedick, Cade, Caliban, Cordelia, Desdemona, Dogberry, Falstaff, Friar Tuck, Iago, Macduff, Oberon, Ophelia, Portia, Puck, Shylock, Sir Toby Belch, Warwick, Wolsey.
Criticism: Shakespeare, Donnelly, Ireland W. H., Glowworm, Wars of the Roses, Blank Verse, Witchcraft, Sonnet, Drama. See also Literature (English).

SHELLEY, PERCY BYSSHE—
Adonais, Cloud, Daffodil, Keats, Meter, Skylark.

SIBERIA—
Ainos, Amur, Baikal, Cossacks, Kamchatka, Lena, Mammoth, Marten, Obi, Reindeer, Saghalien, Steppe, Tartars, Trans-Siberian Railway, Ural Mountains, Vladivostok, Weasel, Willow, Yakutsk, Kennan, Bering Strait.

SILVER—
Occurrence and Properties. See article Silver.
Deposits: Montana, Colorado, Nevada, Utah, Idaho, California, Canada, Mexico, Peru, Potosi, Bolivia, Spain, Germany, Austria, Japan, Australia, Arizona, New Mexico, Japan.
Preparation: Mining, Smelting, Mint, Assaying, Jewelry, Chemistry.
Uses: Bimetallism, Coin, Dime, Dollar, Drachma, Fork, Rupee, Shekel, Shilling, Thimble.

SOCIALISM—
Addams J., Anarchists, Birthdays, Birthday Stones, Birth Rate, Blanc, Brook Farm, Burial, Celibacy, Clan, Club, Coöperative Store, Communism, Fournier, Gorky, Immigration, Industrial Insurance, Insurance (Life), Lassalle, Looking Backward, Marx K., Mortality Statistics, Municipal Ownership, Old Age Pensions, Proudhon, Trades Unions, Unearned Increment, Debs, Pauperism.

SOCIOLOGY—
Schools for Feeble-Minded, Eugenics, Addams Jane, Boy Scouts, Convict Labor, George Junior Republic, Birth Rate, Lindsey, Newgate, Poor Laws, Punishment, Races of Men, Riot, Earl of Shaftesbury, Toynbee, Tenements, Workhouse.

SOUND—
Echo, Orchestra, Piano, Pitch, Sonometer, Speaking-Trumpet, Ventriloquism, Violin, Acoustics, Guitar, Harpsichord, Lute.

SOUTH CAROLINA—
For Products, Animals, and Plants, see Southern States under United States: Products, etc.
For Minerals, see Eastern States under United States: Mineral Products.
Additional References: Savannah, Cotton, Rice, Peach, Watermelon, Sumter, Cowpens, Charleston, Huguenots, Nullification, Marion, Calhoun.

SOUTH DAKOTA—
For Products, Animals, and Plants, see Northern States under United States: Products, etc.
For Minerals, see Northern States under United States: Mineral Products.
Additional References: Missouri, Bad Lands, Black Hills, Cheyenne, Coyote, Dakotas, Parkman, Catlin, Lewis and Clark.

SPAIN—
Area and Position. See article Spain.
Surface: Pyrenees, Sierra, Tagus, Biscay.
Minerals: Copper, Iron, Lead, Tin, Gold, Silver, Mercury, Antimony, Gypsum, Marl, Granite, Limestone, Sulphur.
Animals: Ibex, Chamois, Marten, Lynx, Weasel, Ape, Chameleon, Vulture, Flamingo, Bat, Tunny, Anchovy, Sardine.
Plants: Oak, Chestnut, Olive, Grape, Sugar-cane, Palm, Cotton, Lemon, Orange.
Products: Olive (oil), Wine, Cork, Sugar, Date, Esparto, Cotton, Nut, Dairy Products, Rope, Saffron, Wool, Leather, Steel.
Cities: Barcelona, Cadiz, Cordova, Granada, Madrid, Malaga, Oporto, Seville, Salamanca, Toledo, Valencia, Valladolid.
Persons of Note: Alva, Castelar, Balboa, Columbus, Coronado, Cortez, De Soto, Averroes, Ferdinand V, Genseric, Isabella, Murillo, Philip, Pizarro, Ponce de Leon, Velasquez.
Literature: Cervantes, Cid, Don Quixote, Gil Blas, Literature (Spanish), Amadis of Gaul, Velasquez.

History: Alhambra, Andorra, Armada, Aragon, Balearic Islands, Bullfighting, Canary Islands, Carlists, Castile, Charles V, Cortes, Escorial, Gibraltar, Granada, Hannibal, Inquisition, Moors, Pillars of Hercules, Portugal, Tarshish, Trafalgar, Vandal, Alfonso, Peninsular War, Spanish-American War, Castelar, Aguinaldo.
Statistics. See article Spain.

SPENSER, EDMUND—
Arachne, Autumn, Butterfly, Chaucer, Duessa, Faerie Queene, Graces, Poetry.

SPORTS, GAMES, AND PASTIMES—
Athletic: Athletics, Baseball, Basketball, Bowls, Boxing, Cricket, Croquet, Curling, Dancing, Diving, Fandango, Fencing, Fives, Football, Gladiator, Golf, Handball, Handicap, Hawking, Jiu-Jitsu, Lacrosse, Lawn Tennis, Olympia, Olympic Games, Polo, Quoits, Regatta, Roller Skating, Shinney, Skate, Ski, Skittles, Sling, Snowshoe, Swimming, Ten Pins, Tennis.
Games of Chance: Backgammon, Cards, Dice, Dominoes, Hoyle, Monaco, Roulette, Solitaire.
Games of Skill: Archery, Bagatelle, Billiards, Checkers, Chess, Shuffleboard.
Sporting Exhibitions: Bullfighting, Cockfighting, Derby, Horseracing, Steeplechase, Tattersall's, Bear Baiting.
Juvenile Games: Battledore, Elder, Fast and Loose, Fox and Geese, Jack-o'-Lantern, Jackstones, Jackstraws, Kite, Logomachy, Magic Square, Marbles, Poison, Rebus, Riddles, Toboggan, Sled, Soap Bubbles, Stilts, Swing.
Toys: Black Forest, Doll, Harz Mountains, Kaleidoscope, Nuremberg, Top, Toy.
The Chase: Angling, Boar Hunting, Coursing, Dog, Falcon, Game, Hare, Hawk, Hunting, Setter.

STEVENSON, ROBERT LOUIS—
Black Arrow, Damien, River, Samoa.

SUGAR—
Alcohol, Beet, Cuba, Fermentation, Food, Hawaii, Louisiana, Maple, Porto Rico, Sorghum, Starch, Sugar-cane, United States, Yeast.

SULPHUR—
Properties. See article Sulphur.
Occurrence: Utah, Nevada, Louisiana, Mexico, Popocatepetl, Chile, Sicily, Japan, China, Philippine Islands.
Combinations: Acid, Aniline, Cinnabar, Galena, Pyrites, Vitriol.
Use: Bleaching, Disinfectant, Elevator, Gunpowder, Itch, Matches.

SURGERY AND NURSING—
Ambulance, Anaesthetic, Antiseptic, Appendicitis, Bacteria, Barber, Barton, Bullet, Catgut, Chloroform, Hospital, Leech, Lister, Nightingale, Pasteur, Red Cross Society, Saw, Serum Therapy, Trepanning, Vaccination.

SWEDEN—
Position, Surface, and Area. See article Sweden.
Productions, Occupations, and Manufactures. See statistics under Sweden.
Cities: Gothenburg, Lund, Stockholm.
Noted Persons: Arrhenius, Andree, Bernadotte, Berzelius, Bremer, Charles XII, Eric, Ericsson, Geijer, Gustavus, Lagerlöf, Lind, Linnaeus, Nobel, Nordenskjold, Runeberg, Strindberg, Swedenborg, Tegner, Hedin, Oxenstiern, Celsius.
Other References: Norway, Mythology (Norse), Denmark, Delaware, Literature (Swedish), Norseman, Congress of Vienna, Peace of Westphalia.

SWITZERLAND—
Area, Position, and Boundaries. See article Switzerland.
Mountains: Alps, Bernard Great St., Blanc, Jungfrau, Matterhorn, Rigi, St. Gothard.
Waters: Rhine, Rhone, Danube, Po, Geneva, Constance, Zurich, Lucerne, Como, Staubbach, Mer de Glace.
Animals and Plants. See under Alps.
Towns and Localities: Basil, Berne, Chamouni, Engadine, Geneva, St. Gall, Schaffhausen, Tyrol, Zurich.
Antiquities and Legends: Lake Dwellings, Arnold, Tell.
History, Helvetii, Caesar, Burgundy, Tuileries, Peace of Westphalia.
Government: Initiative and Referendum.
Noted Persons: Agassiz Louis, Andree, Byron, Calvin, Gibbon, Guyot, Lassalle, Pestalozzi, Servetus, Sismondi, Zwingli, Paracelsus, Argand, Bouquet.

TAXATION—
Assessor, Colbert, Customs, George H., Income Tax, Octroi, Single Tax, Smuggling, Tariff, Peter's Pence, Whiskey Insurrection, Reciprocity.

TEMPERANCE—
Absinthe, Dispensary System, Good Templars, Gothenburg, Gough, License, Local Option, Mathew (Father), Prohibition, Women's Christian Temperance Union, Canteen.

TENNESSEE—
For Products, Animals, and Plants, see Southern States under United States: Products, etc.
For Minerals, see Southern States under United States: Mineral Products.
Additional References: Limestone, Nashville, Memphis, Chattanooga, State.

TENNYSON—
Amphion, Arabian Nights' Entertainments, Arthur, Avalon, Camelot, Charles's Wain, Cophetua, Curlew, Dragon Fly, Eagle, Eden, Enoch Arden. Excalibur, Galahad, Godiva, Guinea, Guinevere, Idylls of the King, In Memoriam, Lancelot, Merlin, Moon, Oenone, Orion, Princess, Round Table, Saber.

TEXAS—
For Products, Animals, and Plants, see Southern States under United States: Products, etc.
For Minerals, see Southern States under United States: Mineral Products.
Additional References: Rio Grande, Pecan, Cactus, Rice, Wool, Cattle, Beef, Austin, Galveston, Alma, Santa Anna, Houston.

TEXTILES—
Material: Alpaca, Angora, Cashmere, Cotton, Flax, Hair, Jute, Linen, Pineapple Fiber, Ramie, Shoddy, Silk, Wool, Batting, Warp and Woof.
Processes: Beetling, Bleaching, Calendering, Carding and Combing, Celluloid, Count, Crofting, Embossing, Filling, Finishing, Knitting, Knot, Mercerizing, Napping, Perching, Printing, Scouring, Scutching, Spinning, Weaving.
Machinery: Counting Glass, Distaff, Jacquard Loom, Spinning Wheel, Teasel.
Weaves, Alpaca, Armure, Balbriggan, Basket-cloth, Beaver-cloth, Bedford Cord, Beige, Blanket, Braid, Broadcloth, Brocade, Buckram, Bunting, Burlap, Calico, Cambric, Camel's Hair, Canvas, Carpet, Cashmere, Cassimere, Challis, Chambray, Cheesecloth, Chenille, Chiffon, China Silk, Chintz, Cheviot, Cloth of Gold, Canton Flannel, Corduroy, Crape, Crash, Cravanette, Crepon, Crinoline, Damask, Delaine, Denim, Dimity, Doeskin, Drilling, Duck, Embroidery, Foulard, Frieze, Fustian, Gingham, Gloria, Grosgrain, Gunny, Henrietta, Huckaback, Jersey, Khaki, Lace, Lawn, Linen, Linsey-Woolsey, Lisle, Mull, Muslin, Nainsook, Netting, Organdie, Outing Cloth, Percale, Pile Fabrics, Pique, Plaid, Plush, Pongee, Poplin, Print, Rags, Rep, Ribbon, Rug, Sateen, Satin, Scrim, Serge, Swiss, Taffeta, Tapestry, Terry Cloth, Ticking, Tweed, Twill, Worsted.
Inventors: Arkwright, Crompton, Hargreaves, Owen, Whitney.
General Terms: Child Labor, Chemnitz, Fabric, Felt, Flock, Lowell, Lyons, Oilcloth, Sewing, Sweat-Shop, Spool, Thread.

THACKERAY—
Becky Sharp, Caricature, Literature (English), Newcomes, Pendennis, Punch, Vanity Fair.

THOROUGHFARES—
Appian Way, Broadway, Bridge, Corduroy, Cumberland Road, Ermine Street, Fleet, Khyber Pass, Lombard Street, Macadam, Pall Mall, Road, St. Gothard, Simplon, Strand, Subway, Tunnel, Unter den Linden, Wall Street, Watling Street.

TIME—
Measurement of Time: Almanac, Calends, Calendar, Chronology, Clepsydra, Clock, Day, Elgin, Greenwich, Hourglass, Pendulum, Seasons, Standard Time, Sundial, Waltham, Watch.
Periods of Time: Age, Autumn, Day, Equinoxes, Night, Seasons, Spring, Winter, Year. See also names of the months of the year and days of the week.
Holidays and Festivals. See Holidays and Festivals.

TOBACCO—
Betel, Cigar, Coco, Hashish, Havana, Narcotics, Nicotine, Opium, Pipe, Snuff, Sumatra, Tampa, Tobacco.

TRAVEL—
Anchor, Ass, Canal, Car, Caravan, Carriage, Express, Hotel, Jinrikisha, Portage, Palanquin, Pullman, Railroad, Ride and Tie, Sedan, Snowshoe, Stage, Steamboat, Steamship, Street Railway.

TURKEY—
Area and Position. See article Turkey.
Surface and Waters: Ararat, Lebanon, Arabia, Armenia, Asia Minor, Syria, Palestine, Aegean Sea, Bosphorus, Dardanelles, Black Sea, Adriatic Sea, Red Sea, Jordan, Dead Sea, Euphrates, Marmora.
Minerals: Coal, Iron, Copper, Zinc, Silver, Gold, Antimony, Alum, Salt, Kaolin, Chalk, Emery, Meerschaum, Limestone.
Animals: Leopard, Lion, Jackal, Hyena, Marten, Hedgehog, Squirrel, Mole, Vulture, Crane, Stork, Beaver, Nightingale, Quail, Camel, Ass, Sheep.
Plants: Pine, Cedar, Box, Myrtle, Sycamore, Palm, Almond, Orange, Lemon, Olive, Fig, Pomegranate, Grape, Lilac, Maize, Coffee, Tobacco, Cotton.
Products: Oil, Wine, Perfume, Silk, Wool, Flour, Opium, Carpet, Nut, Salt, Raisin, Mohair, Tobacco, Olives, Cotton.
Cities: Adrianople, Bagdad, Constantinople, Smyrna, Damascus, Saloniki.
History: Alaric, Arab, Balkan States, Belgrade, Byzantium, Carthage, Christianity, Circassia, Crescent, Crete, Crimea, Crusades, Dido, Egypt, Goths, Greece, Jerusalem, Khedive, La Guayra, Mohammed, Moloch, Mosque, Palestine, Rumania, Russia, Seraglio, Sidon, Sublime Porte, Sultan, Theodoric, Turanian, Turkey, Tyre, Berlin Treaty, Bosnia, Angora, Treaty of Paris, Seljuks, Russo-Turkish War.

UNITED STATES—
Mountains: Alleghany, Appalachians, Cascade Mountains, Catskill Mountains, Cordilleras, Katahdin, Pike's Peak, Rocky Mountains, White Mountains, Kearsarge, Blue Ridge, Adirondacks, Mount McKinley.
Rivers and Lakes: Colorado, Columbia, Hudson, Merrimac, Mississippi, Missouri, Niagara, Potomac, Red River, Rio Grande, St. Lawrence, Sault Ste. Marie, Shoshoni, Snake, Yukon, Champlain, Erie, Great Lakes, Great Salt Lake, Huron, Itasca, Michigan, Ontario, Superior, Tahoe, Salton Sea.
Products, Animals, and Plants:
Southern States: Cotton, Rice, Vegetables, Pitch, Tar, Lumber, Resin, Coal,

Coke, Iron, Ironware, Tiling, Porcelain, Bear, Fox, Deer, Wolf, Alligator, Partridge, Terrapin, Fig, Magnolia, Turkey, Pine, Canebrake, Grape, Persimmon, Peach, Lumber, Watermelon, Turpentine, Sponge, Cedar, Orange, Pineapple, Phosphate, Cigar, Tobacco, Quail, Waterfowl, Fish, Cypress, Cherry, Apricot, Holly, Gum, Pecan, Sycamore, Raccoon, Squirrel, Opossum, Sweet Potato, Peanut, Honey, Palmetto, Hemp, Oyster, Whiskey, Bluegrass, Poplar, Grouse, Leather, Jasmine, Buzzard, Tanager, Cactus, Sagebrush, Yucca, Mockingbird, Peccary, Agave, Ostrich, Antelope, Armadillo, Rattlesnake, Centipede, Tarantula, Coyote, Nut, Raisin, Cougar, Grizzly.

Middle States: Lumber, Furniture, Flour, Grass, Soap, Candle, Boots and Shoes, Car, Clothing, Ash, Elm, Birch, Maple, Chestnut, Carpet, Leather, Coke, Hemlock, Pine, Ship, Oak, Silk, Pottery, Sewing Machine, Locomotive, Cement, Terra Cotta, Hickory, Apple, Pear, Peach, Plum, Oats, Butter, Potato, Honey, Deer, Robin, Meadow Lark, Grape, Badger, Barley, Clover, Alfalfa, Timothy, Tobacco, Papaw, Persimmon, Petroleum, Poplar, Hemp, Corn, Sycamore, Coal, Iron, Raccoon, Quail, Bluebird, Wren, Crow.

Northern States: Bear, Deer, Wildcat, Salmon, Halibut, Herring, Grouse, Fir, Cedar, Hemlock, Pine, Sagebrush, Tamarack, Beaver, Marten, Muskrat, Pelican, Lizard, Crow, Oyster, Fish, Cereals, Vegetables, Fruit, Dairy Products, Cranberry, Blueberry, Plum, Hawk, Owl, Pigeon, Butternut, Elm, Mink, Otter, Hay, Cement, Golden Rod, Calla, Lady's Slipper, Rose, Pickerel, Rabbit, Buffalo, Bighorn, Moose, Confectionery, Books, Periodicals, Textiles, Clock, Glove, Collars and Cuffs, Newspaper, Leather, Lead-Pencils, Printing, Paper, Typewriter, Dynamo.

Minerals:

1. **Eastern Section:** Granite, Limestone, Sandstone, Emery, Salt, Graphite, Coal, Petroleum, Gas, Marble, Gypsum, Tin.
2. **Western Section:** Copper, Gold, Silver, Chalcedony, Salt, Brass, Mercury, Petroleum, Placer Mining, Zinc, Lead, Sapphire, Coal, Clay, Antimony, Silver, Borax, Agate, Amethyst, Slate, Sulphur, Turquoise, Opal, Platinum, Nickel, Iron, Limestone, Asbestos, Tungsten, Onyx.
3. **Northern Section:** Coal, Clay, Gypsum, Granite, Slate, Limestone, Iron, Copper, Sandstone, Gas, Salt, Cement, Gold, Alloy, Solder.
4. **Southern Section:** Coal, Iron, Emery, Magnesium, Limestone, Graphite, Sandstone, Marble, Slate, Natural Gas, Ochre, Lithographic Stone, Phosphate, Sulphur, Talc, Agate, Opal, Diamond, Mica, Marl, Stalactite, Garnet, Ruby, Emerald, Zinc, Copper, Tin, Asbestos, Gold, Petroleum.

Cities and Towns. See Cities: North America.

Political Divisions. See articles on the several states and territories. Also Philippine Islands, Hawaii, Porto Rico, Guam, Bering Sea.

Exploration and Discovery: Amerigo Vespucci, Balboa, Cabot, Coast and Geodetic Survey, Coronado, Columbus, De Long, De Soto, Greeley, Juneau, Fremont, Hudson, La Salle, Marquette, Pike, Pizarro, Ponce de Leon, Peary, Schwatka, Schoolcraft, Tonti, Smith.

Colonial Period: Alden J., Andros, Articles of Confederation, Albany Congress, Bacon, Bradford, Brewster, Braddock, Berkeley, Blue Laws, Carver, Charter Oak, Franklin, Frontenac, Hutchinson (Anne), Henry P., Jamestown Colony, Mecklenberg Declaration, Morris Robert, New England, New England Confederation, Oglethorpe, Pilgrim, Patroon, Phipps, Plymouth Colony, Pocahontas, Raleigh Sir W., Robinson, Speedwell, Standish, Stuyvesant, Washington, White, Williams Roger, Winthrop, Town Meeting.

Territorial Expansion: Alaska, Austin, Blennerhasset, Boone, California, Carson, Carver, Catlin, Clark W., Clark R., Cody, Crockett, Florida, Fremont, Gadsden Purchase, Guam, Houston, Kenton, Lewis and Clark Expedition, Louisiana Purchase, Monroe Doctrine, Northwest Territory, Oregon, Philippine Islands, Hawaii, Porto Rico, St. Augustine, Santa Fe, Sevier, Spanish-American War, Texas, Williams R., Whitman.

Constitution: Albany Congress, Calhoun, Confederacy, Dred Scott, Federalist, Hamilton A., Hartford Convention, Kansas-Nebraska Bill, Missouri Compromise, Nullification, Shays' Rebellion, States Rights, Wilmot Proviso, Congressional Record.

Slavery: Abolitionist, Brown John, Coffin, Confederacy, Dred Scott, Emancipation, Free Soil, Freedman's Bureau, Fugitive Slave Law, Garrison, Helot, Lovejoy, Negro, Peonage, Serf, Story, Stowe H. B., Compromise of 1850, Taney, Liberator, Turner N., Wilson H., Wilmot Proviso, Wilberforce, Yucatan.

Revolutionary Period: Allen E., Andre, Arnold, Bacon, Bills of Rights, Boston Massacre, Boston Tea Party, Burgoyne, Conway Cabal, Cornwallis, Cincinnati Society, Cowpens, Declaration of Independence, De Kalb, Franklin, Gates, Greene, Hale, Hamilton A., Hancock, Henry P., Johnson, Jones J. P., Kosciusko, Lafayette, Lee R. H., Lexington, Liberty Bell, Madison

J., Marion, Morris R., Otis, Paine, Princeton, Putnam, Pulaski, Revere, Minute Man, Navigation Acts, Stamp Act, Stark, Steuben, Treaty of Paris, Washington, Wayne, Writs of Assistance, Yorktown.

War of 1812: Alien and Sedition Acts, Bainbridge, Perry O. H., Decatur, Preble.

Civil War: Appomattox, Alabama, Antietam, Andersonville Prison, Battle Above the Clouds, Burnside, Beauregard, Bull Run, Bushwhackers, Butler, Bragg, Buell, Contraband, Cook, Chattanooga, Chickamauga, Custer, Crook, Carpet Baggers, Confederate Veterans, Copperhead, Crittenden, Dix, Early, Farragut, Fremont, Forest, Gettysburg, Gordon G. W., Gordon J. B., Hancock, Hooker, Hampden, Halleck, Jackson (Stonewall), Johnston A. S., Johnston J. E., Lee, Libby Prison, Longstreet, Logan, MacClellan, Meade, Miles, Monitor and Merrimac, McDowell, McPherson, Morgan, Mosby, McClernand, Porter D., Porter D. D., Pickett, Pemberton, Pope, Price, Reconstruction, Rosecranz, Stuart, Schofield, Scott, Schurz, Sedgwick, Shafter, Smith A. J., Smith E. K., Sickles, Sherman, Semmes, Secession, Shenandoah, Sheridan, Stephens, Slidell, Stanton, Sumner, Seward, Toombs, Thomas G H., Trent Affair, Vicksburg, Wallace, Wilkes, Wheeler, Van Dorn.

Spanish-American War: Cuba, Dewey, Philippine Islands, Aguinaldo, Rough Riders, Roosevelt.

Politics: Albany Regency, American Party, Barnburner, Democratic Party, Gerrymander, Kitchen Politics, Know-Nothing, Ku-Klux-Klan, Logrolling, People's Party, Loco-foco, Republican Party, Salary Grab.

Statesmen: Adams C. F., Adams J., Adams J. Q., Adams S., Arthur, Benton, Bayard, Blennerhasset, Butler, Buchanan, Bailey, Ball, Benjamin, Beveridge, Breckenridge, Calhoun, Cameron, Cannon, Carlisle, Cass, Choate, Clark, Clinton, Clay, Cleveland, Crittenden, Davis, Douglas, Donnelly, Dorr, Depew, Dix, Evarts, Edmunds, Fessenden, Fillmore, Folk, Franklin, Fremont, Garfield, Garland, Grant, Hay, Harrison B., Harrison W. H., Hayes, Hamilton, Jackson A., Jay, Jefferson, Johnson, Johnson J. A., Johnson T. L., Hendricks, Hill, Hughes, Hamlin, Hayne, Knox, La Follette, Lincoln, Lincoln R. T., Madison, Monroe, McKinley, Morris, Otis, Penn, Pierce, Polk, Phillips, Randolph P., Randolph E. J., Randolph J., Read T. B., Reid, Roosevelt, Root, Randall, Stephens, Sherman, Seward, Stanton, Stevens T., Sumner, Taft, Taylor Z., Thurman, Tillman, Toombs, Tilden, Tyler J., Tyler M. C., Webster, Wilson H., Wilson W., Van Buren, Washington, Yancey.

Merchants and Financiers: Astor, Carnegie, Cooke, Colbert, Cornell, Cooper, Faneuil, Field, Gould, Harriman, Hill, Hopkins, Lincoln, Morris, Morgan, Peabody, Rockefeller, Vanderbilt.

Musicians and Composers: Sousa, Thomas, De Koven, Nordica.

Artists and Sculptors: Abbey, Alexander, Blashfield, Copley, French, Innes, La Farge, MacMonnies, Powers, Peale R., Peale C. W., Pearse, Powers, Pyle, Remington, Rogers J., Rogers R., Sargent, Saint-Gaudens, Taft, Trumbull, Vedder, Whistler.

Poets: Aldrich, Barlow, Bryant, Carleton, Cary (Alice and Phoebe), Drake, Dunbar, Emerson, Field, Freneau, Gilder, Halleck, Holland, Howe Mrs., Key, Lanier, Larcom, Longfellow, Lowell, Jackson H. H., Miller (Joaquin), Markham, O'Hara, Payne, Poe, Riley, Read, Saxe, Sigourney, Taylor, Thaxter, Trowbridge, Whittier, Whitman, Willis, Wilcox.

Essayists and Critics: Alcott, Burritt, Burroughs, Dodge, Dix, Emerson, Harrison, Higginson, Holmes, Harland, Keller (Helen), Mitchell, Matthews, Ossoli (Margaret F.), Paulding, Payne, Stedman, Schurz, Stanton E. C., Sangster Mrs. M., Repplier, Thoreau, Warner, White, Winter, Van Dyke, Willard (Frances), Tarbell (Ida).

Novelists: Adams W. T., Alcott, Aldrich, Allen, Abbott, Bacheller, Bellamy, Brown, Burnett, Cooke, Catherwood, Connor, Craddock (Mary Murfree), Coffin, Carlton, Crawford, Churchill, Cooper, Davis R. H., Davis Mrs. R. H., Deland, Eggleston, Foote, Freeman, French, Ford, Fox, Greene Mrs., Harte, Hawthorne, Howells, Jewett, Jackson, James, Johnston, Kennedy, Kellogg, London, Murfree, Mitchell, Page, Perry (Nora), Gail Hamilton, Pyle, Rice A. H., Riggs K. D., Simms, Smith F. H., Southworth E., Stockton, Stoddard, Stone, Tarkington, Terhune, Thompson, Tourgee, Trowbridge, Wallace, Ward E. S. P., Wister, Whitney.

Historians: Abbott J. S. C., Bancroft, Fiske, Goodrich, Motley, Parkman, Prescott, Sparks, Tarbell, Thwaites, Wilson, Tyler.

Humorists: Ade, Bangs, Browne, Burdette, Clemens, Holley (Marietta), Locke, Marvel, Mitchell, Nye, Old Grimes, Nasby, Nast, Harris, Dunne, Partington, Shillaber, Shaw.

Publishers and Journalists: Bennett, Bonner, Curtis, Dana, Dodge, Fields, Garland, Garrison, Gilder, Grady, Greeley, Hearst, Hubbard, Lippincott, Mabie, Poole, Putnam, Sangster, Scudder, Stanley, Stoddard, Paulding, Higginson, Spofford, Kennan, Schurz, Watterson.

Jurists: Brewer, Chase, Hughes, Harlan, Jay John, Lamar, Livingston, Lindsay, Fuller, Marshall, Kent, Story, Taney, White Edward, Whitney, Wilson.

Clergymen: Abbott, Abbott L., Beecher, Brooks, Cartwright, Clark, Channing W.

E., Channing W. H., Cotton, Dwight, Edwards, Eliot, Gladden, Gibbons, Hutchinson (Anne), Ireland, Hale, Mather, Moody, Parker, Parkhurst, McCloskey, Quigley, Talmage, Williams, Whipple.

Scientists:

1. **Physicists, Chemists, Inventors, etc.:** Brown, Bartram, Bell, Bessemer. Clark, Colt, Darlington, Edison, Ericsson, Field, Fulton, Fitch, Franklin, Gatling, Goodyear, Henry, Hoe, Howe, Maxim H., Mayo, McCormick, Mergenthaler, Mitchell (Maria), Michelson, Morse, Pullman, Langley, Osler, Rush, Rittenhouse, Rumford, Tesla, Newcomb, Westinghouse, Whitney, Wiley.
2. **Naturalists, Geographers, etc.:** Agassiz, Audubon, Baird, Burroughs, Clark, Gray, Heilprin, Hitchcock, Jordan, Le Conte, Long, Maury, Muir, Powell, Seton, Thoreau, Van Hise, Winchell, Wilson A.
3. **Economists, Psychologists, etc.:** Dewey, Ely, Harris Wm. T., James, Ladd, Le Conte, Royce, Wright.

Playwrights and Actors: Ade, Adams (Maud), Anderson (Mary), Barrett, Booth, English, Forrest, Jefferson, Mansfield, Morris (Clara).

Education and Reform: Adams C. K., Adams, Anthony, Adler, Andrews, Angell, Ann Arbor, Annapolis, Barton, Barnard, Bailey, Booth, Brown E. E., Bryn Mawr, Butler, Carnegie Foundation, Chicago University, Child Labor, Claxton, Columbia, Cornell, Cooper Institute, De Pauw University, Draper, Eliot, Dix, Everett, Experiment Stations, Forest Service, George H., Harvard, High School, Harris, Heilprin, Hadley, Hampden Institute, Hall Labor Bureau, Harper, Hopkins, Initiative and Referendum, Leland Stanford Junior University, Felton, Jordan, Lyon, Livermore, Lockwood, Mann, Mott, Municipal Ownership, Northrup, Norton, New England Primer, Normal School, Owen, Johns Hopkins, Leland Stanford University, Murray, McCosh, Parker, Palmer, Page, Pittman, Porter, Peabody, Phillips, Prohibition, Princeton, Rockefeller, Recall, Schools, Smith G., Smithsonian Institution, Shaw (Anna), Tulane, Tuskegee Institute, Vanderbilt, Washington B. T., Wellesley, West Point, Willard (Frances), Willard E. H., Webster N., Whitney, William and Mary College, University, Yale, Young (Ella F.).

Miscellaneous Noted Persons: Barnum, Bergh, Booth, Brown J., Burr, Cox (Palmer), Coxey, Debs, Dowie, Dow (Neal), Eddy (Mrs.), Garrison, George (Henry), Gough, Gompers, Ingersoll, Lafitte, Lovejoy, McCrea (Jane), Mitchell, Phillips, Powderly, Owen R., Scott (Dred), Turner (Nat), Tweed, Whitney.

UTAH—

For Products, Animals, and Plants, see Northern States under United States: Products, etc.

For Minerals, see Western States under United States: Mineral Products.

Additional References: Young B., Mormons, Great Salt Lake, Salt, Gold.

VEHICLES—

Automobile, Bicycle, Cab, Carriage, Cart, Fiacre, Hickory, Hurdle, Jaunting Car, Jinrikisha, Omnibus, Palanquin, Sled, Wagon.

VENEZUELA—

Area and Position. See article Venezuela.

Surface and Waters: Andes, Cassiquiari, Llanos, Orinoco.

Minerals: Asphalt, Copper, Coal, Gold, Iron, Lead, Salt, Silver, Sulphur, Tin.

Animals: Monkey, Tapir, Sloth, Deer, Alligator, Iguana, Boa Constrictor, Parrot, Vulture, Flamingo, Crane, Hummingbird, Cattle, Sheep, Goats.

Plants: Cacao, Coffee, Cotton, Dye-woods, Maize, Sugar-cane, Tobacco, Wheat.

Products: Cocoa, Coffee, Gold, Rubber, Sugar, Tobacco, Cocoanut, Cotton, Sarsaparilla, Cinchona, Copal, Leather.

Cities: Caracas, La Guayra.

History: Bolivar, Spain.

VERMONT—

For Products, Animals, and Plants, see Northern States under United States: Products, etc.

For Minerals, see Eastern States under United States: Mineral Products.

Additional References: Allen, Champlain, Ticonderoga, Bennington.

VIRGIL—

Achates, Achilles, Aeneas, Aeneid, Ajax, Anchises, Ascanius, Dido, Homer, Iliad, Latin, Literature, Maecenas, Poetry, Schliemann, Troy.

VIRGINIA—

For Products, Animals, and Plants, see Southern States under United States: Products, etc.

For Minerals, see Southern States under United States: Mineral Products.

Additional References: Shenandoah, Potomac, Chesapeake, Natural Bridge, Blue Ridge, Tobacco, Bacon, Berkeley, Fairfax, Jamestown, Jefferson, Kentucky, Lee R. E., London Company, Mount Vernon, Pocahontas, Raleigh, Richmond, Smith Capt. John, Washington, William and Mary College, Yorktown, Washington and Lee University, Randolph, Henry P., Grant, McClellan, Jackson Thomas J., Early Civil War, West Virginia, Sheridan.

VOLCANOES—

Europe: Etna, Hecla, Stromboli, Vesuvius.

Africa: Kilimanjaro.

North America: Popocatapetl.

South America: Cotopaxi, Aconcagua.

Antarctic Regions: Erebus.

See also: Basil, Hawaii, Japan, Java,

Lava, Naples, Philippine Islands, Pompeii, Pumice, Martinique, Earthquake.

WASHINGTON—

For Products, Animals, and Plants, see Northern States under United States: Products, etc.

For Minerals, see Western States under United States: Mineral Products.

Additional References: Columbia, Snake, Puget Sound, Silver, Salmon, Pine, Lumber, Canning, Seattle, Spokane, Tacoma, Gray, Vancouver, Astoria, Alaska-Yukon Exposition, Whitman.

WATER—

Aqueduct, Artesian, Artesian Well, Canal, Drainage, Filter, Hail, Ice, Irrigation, Niagara, Rain, Salton Sea, Sanitary Science, Sewage, Snow, Spa, Spring, Shoshoni, Staubbach, Steam, Tides, Waterpower, Waters (Mineral), Waterworks, Boiling, Flood, Waterspout.

WEIGHTS AND MEASURES—

Length: Inch, Foot, Yard, Furlong, Stadium, Mile, Verst. See also Acre.

Dry Measure: Quart, Gallon, Peck, Bushel.

Money: Shekel, Drachma, Talent, Penny, Shilling, Dime, Dollar, Scudo, Sequin, Cash, Pound, Ruble, Yen, Paper Money.

See also Gram, Ounce, Ton, Avoirdupois, Troy, Winchester, Metric System, Baker's Dozen, Mensuration, Weights and Measures, Scruple, Standards, Dyne, Erg, Carat, Latitude, Longitude.

WEST VIRGINIA—

For Products, Animals, and Plants, see Southern States under United States: Products, etc.

For Minerals, see Eastern States under United States: Mineral Products.

Additional References: Petroleum, Gas, Coke, Horticulture, Shenandoah, Trout, Virginia, Sheridan.

WHITTIER, JOHN GREENLEAF—

Abolitionists, Alder, Andiron, Arbutus, Assiniboin, Atlantic Monthly, Bagpipe, Barbara Frietchie, Cart, Cary, Fremont, Indian Summer, Larcom, Oriole, Quaker, Sachs, Snowbound, Webster.

WIND—

Anemometer, Boreas, Chinook, Cyclone, Foehn, Hurricane, Monsoon, Simoon, Sirocco, Trade Winds, Weather Bureau, Whirlwind, Windmill.

WINE—

Burgundy, Champagne, Catawba, California, Cream of Tartar, Fermentation, France, Grape, Moselle, Oporto, Sherry, Tokay.

WISCONSIN—

For Products, Animals, and Plants, see Northern States under United States: Products, etc.

For Minerals, see Northern States under United States: Mineral Products.

Additional References: Copper, Cattle, Beer, Matches, Chippewa, Coal, Coke, Tanning, Lead, Zinc, Hop, Malt, Lake.

WOMAN SUFFRAGE—

Anthony, Howe, Livermore, Suffrage, Willard, Wyoming, Mott, Shaw, Lockwood.

WORDSWORTH—

Daffodil, Dryden, Lake Poets, Primrose, Swan.

WRITING—

Book, Copyright, Cuneiform Writing, Dictionary, Dialect, Envelope, Faber, Hieroglyphics, Ink, Lead-Pencil, Manuscript, Notary, Paper, Papyrus, Pen, Pencil, Pitman, Runes, Scribe, Seal, Shorthand, Stationery, Typewriter.

WYOMING—

For Products, Animals, and Plants, see Northern States under United States: Products, etc.

For Minerals, see Western States under United States: Mineral Products.

Additional References: Black Hills, Yellowstone National Park, Bad Lands, Rocky Mountains, Fremont, Miles, Silver, Cheyenne.

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